International Abstracts of Surgery

MARCH 1959

VOLUME 108
NUMBER 3

Collective Review

MESENTERIC VASCULAR OCCLUSION

WILLIAM E. DEMUTH, JR., M.D., F.A.C.S., Carlisle, Pennsylvania, and
WILLIAM T. FITTS, JR., M.D., F.A.C.S., and
LEWIS T. PATTERSON, M.D., Philadelphia, Pennsylvania

A REVIEW OF THE LITERATURE on mesenteric vascular occlusion should be timely. The rapid advance of vascular surgery, the increasing use of portal systemic vein anastomosis in the treatment of portal hypertension, the aging population, and the decline of syphilitic infection are but a few changes of recent years which might make this subject of vital interest to surgeons.

Mesenteric vascular occlusion was first described by Antonio Beneviene in the fifteenth century. Tiedman (119) stressed the possible clinical implications of the condition in 1843, and in the following decade Virchow (121, 122) published case reports. In 1895 Elliot (38) reported the first intestinal resection in the treatment of this lesion. Trotter (120), in 1913, wrote a monograph embracing 359 cases recorded from the world literature and added 7 cases of his own. Reports of several hundred cases have since been published, and the literature is steadily growing.

The literature dealing with diagnosis and treatment is by and large in agreement; resection is the treatment of choice. The operative mortality is high; the mortality with expectant treatment approaches 100 per cent. In view of this agreement we do not further consider diagnosis or treatment.

No such agreement exists regarding the underlying causes of the disorder. Marked divergence exists in the reported incidence of arterial and venous occlusions.

Our series of 42 cases is not large enough to permit us to draw conclusions regarding the pathogenesis, and this criticism can justifiably be leveled at the large majority of reported series of cases. Etiology will vary widely, depending on the part of the world in which the author lives. Many reports furnish excellent information regarding some of the patients included, and in other instances the information is fragmentary, sometimes unproved by operation or autopsy, and therefore unacceptable. For this reason, a comprehensive review of reliable data is necessary if the relative incidence of causes of this rather unusual clinical condition is to be determined.

The specific literature on mesenteric vascular occlusion is not extensive. It could be reviewed in a short time by any reader. However, some of our most enlightening information was obtained

From the Harrison Department of Surgical Research, Schools of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania.

not from these reports, but rather from literature pertaining to the parent disease which gave rise to mesenteric vessel occlusion, e.g., periarteritis nodosa, arteriosclerosis, portal hypertension, etc. In the course of this investigation approximately 600 articles have been reviewed, and information which we felt to be reliable has been used. No case unproven by operation or autopsy was considered. Microscopic examination of the tissue was required before we considered primary vessel disease to be proven.

Forty-two instances of mesenteric vascular occlusion are herein reported. Thirty-eight of these were encountered on the Surgical Service of the Hospital of the University of Pennsylvania from 1930 to 1956, and four cases from the Surgical Service of the Carlisle Hospital are included.

ANATOMICAL CONSIDERATIONS

In arterial obstructions the superior mesenteric artery is involved in at least 90 per cent of patients according to Shackelford (108). The exact site of vessel occlusion was established in 32 instances in our group of 42 patients, and the superior mesenteric artery was found to be involved in 22 (70 per cent). In the small number in which the inferior mesenteric artery is involved, the prognosis is much better, and it is probable that many such occurrences do not gain attention. The large recent experience with intentional ligation and division of the inferior mesenteric artery during the replacement of aortic segments indicates that the large intestine can easily survive without this vessel.

The superior mesenteric artery supplies blood to the intestinal tract from the second portion of the duodenum to the midtransverse colon. From a functional point of view this is an end artery (73, 74, 100). Anastomoses do exist between the superior pancreaticoduodenal branch of the celiac axis and the inferior pancreaticoduodenal artery, a branch of the superior mesenteric. The inferior mesenteric artery probably plays but little, if any, role in supplying blood to the small intestine if the superior mesenteric artery is occluded. Interesting exceptions to this rule will be described later. According to Cokkinis (27), no anastomoses exist between the vasa recta, the small parallel vessels arising from the convexities of the terminal arcades, but a profuse submucous vascular plexus furnishes an excellent collateral supply between terminal branches of the larger mesenteric vessels (84, 99). Except for the aforementioned anastomotic channels, none of significance exist.

That the existing pathways of circulation do occasionally play a very important role in collateral circulation is illustrated by the following examples in which no abnormality of the intestine was demonstrated. A case reported by Chiene (24) is remarkable. The dissection of the body of a 65 year old woman in the anatomical laboratory at Edinburgh in 1868 revealed a complete occlusion of the abdominal aorta which extended down to the bifurcation. The branches of the superior mesenteric artery were filled by injection of the huge superior hemorrhoidal artery which was as large as the femoral artery. A recent experience reported by Rob and Owen (100), in which both celiac axis and superior mesenteric artery were intentionally ligated and divided with uneventful recovery of the patient, adds another dramatic instance of survival dependent upon the collaterals supplied by the inferior mesenteric artery. Karcher (63) reported a case of complete superior mesenteric artery occlusion with survival, and Moore (81) cites several such instances. Tiedman (119) and Virchow (121) both expressed the belief that gradual occlusion of any mesenteric vessel could be tolerated.

One case of superior mesenteric artery occlusion with survival appeared in our series.

Case report. W. McC., a 56 year old white man, was admitted to the Medical Service of the Hospital of the University of Pennsylvania on August 27, 1947. The clinical diagnosis was myocardial infarction, and this was supported by examination of the electrocardiogram. The patient expired the following day.

Pertinent autopsy findings. The myocardial infarct was demonstrated. The superior mesenteric artery was found to be completely occluded by an organized thrombus which was adherent to the arterial wall. No evidence of any gross or microscopic abnormality was found in the small or large intestine.

The anatomical features of the mesenteric vasculature are extremely important in the development of gangrene of the intestine following obstruction of the mesenteric vessels. However, the intense vasospasm induced by the sudden occlusion of the superior mesenteric artery is probably as much, or more, responsible for the ensuing morbid changes as the architecture of

the involved vessels. The experimental work of Laufman and Method (70), Welch (129), Rothschild (104), and Klein (64), and the very interesting clinical experience in 2 patients reported by Orr, Lorhan, and Kaul (89) definitely indicate a prominent connection between vasospasm and the intestinal changes which follow.

At best, however, the number of patients surviving occlusion of the superior mesenteric artery must be small; gangrene of the dependent segment of intestine is the rule.

The superior mesenteric vein drains the small intestine, ascending colon, and proximal half of the transverse colon. It joins the inferior mesenteric vein behind the neck of the pancreas to form the portal vein. The inferior mesenteric vein drains the left colon. In the operation for paraduodenal internal hernia this vessel may be vulnerable to injury when the neck of the hernial sac is being enlarged to facilitate reduction. The effects of sepsis, portal hypertension, trauma, and specific vein disorders will be considered.

Pathology and Pathologic Physiology

The gross and microscopic appearance of an involved segment of intestine following mesenteric occlusion has been well described by Boyd (16). "The effected portion of the bowel is thickened, dark red in color, and soon becomes gangrenous. The limits are usually sharply defined, but the demarcation may be more gradual. The entire bowel wall is stuffed with blood, the mucosa is necrotic and may be ulcerated, the lumen contains thick tarry blood, the serous coat is covered by an inflammatory exudate, the peritoneal cavity contains bloody fluid, or there may be a general peritonitis. The mesentery is thickened and contains large patches of hemorrhage; the mesenteric veins are greatly engorged, and the mesenteric glands are swollen and hemorrhagic."

This description covers the usual case coming to operation or autopsy. However, it represents the morbid end-state, but pathologic states of less severity are known to occur. Occlusion of branches of the mesenteric artery may result in cicatricial stenosis of the intestine and at least temporary loss of the mucous membrane (95, 103).

Table I demonstrates the reported incidence of arterial and venous involvement from several sources. Much has been written regarding the differences in the clinical picture and pathologic findings resulting from venous as opposed to arterial occlusion (17, 36, 61). The literature reveals marked disagreement in the incidence of venous versus arterial involvement. One explanation for the divergence is immediately apparent. When autopsy material is considered, relatively accurate information concerning the vessel involved can be obtained. When patients operated on are included it is obvious that the localization is often impossible. Since treatment is not altered on the basis of this finding, prolonged or painstaking dissection is not justified in the critically ill patient for academic satisfaction alone.

TABLE I.—PERCENTAGES OF SELECTED REPORTED SERIES DEMONSTRATING THE RELATIVE INCIDENCE OF ARTERIAL AND VENOUS OCCLUSION

Authors (Year)	*Arterial occlusion (Per cent)*	*Venous occlusion (Per cent)*	*Combined arterial and venous occlusion (Per cent)*	*Unknown (Per cent)*
Trotter (1913)	53	41	6	—
Cokkinis (1926)	18	63	1	18
Larson (1931)	39	44	17	—
Whittaker and Pemberton (1938)	32	45	23	—
Jenson and Smith (1956)	56	24	—	20
DeMuth, Fitts, and Patterson	47	24	5	24

Furthermore, experimental observations on animals have cast great doubt on the previously popular concept that arterial occlusion leads to an anemic infarct and venous thrombosis to a hemorrhagic infarct. Laufman and Method (70) demonstrated conclusively that arterial occlusion eventually results in a hemorrhagic infarct indistinguishable from that seen with venous obstruction. Faber (40) postulated that positive portal vein pressure caused a reflux of blood from the veins to result in extravasation of blood into the bowel wall. Warren and Eberhard (126) explain the sequence of events by pointing out that one of the first responses of the intestine to interference with its oxygen supply is tonic contraction. This not only completes the ischemia by sheer muscular pressure on the

small intramural vessels, but by interfering with peristalsis, causes stagnation of the blood stream and induces extension of thrombosis, edema, and extravasation of the blood. It is probable that the lack of distention, so frequently encountered by clinicians, in mesenteric vessel occlusion in its early stages may be explained by this mechanism.

Although we are not considering diagnosis in this article, it seems pertinent to point out that the predictable results of arterial versus venous obstruction, as demonstrated by Laufman and Method (70) in the experimental animal, may not be pertinent in assisting in clinical diagnosis. Jackson, Porter, and Quinby (57) reported a group of 121 patients in whom the number running a clinical course longer than 8 days closely approximated the number running a shorter course. Although Warren and Eberhard (126) reported that arterial occlusion is almost always a sudden embolic affair and that venous occlusion by thrombosis was characteristically slower, they emphasized that the difference in the speed of events may not be clinically obvious. The duration of symptoms did not correlate with the type of obstruction, arterial or venous, in our series. When we considered the cases in which only arterial or only venous obstruction existed, the duration of symptoms ranged from less than one hour to 168 hours in both groups with the exception of one case of venous thrombosis with a history of almost 400 hours' duration. Also, the evidence is convincing that mesenteric vessel occlusion may occur in stages in a considerable percentage of cases. Berry and Bougas (11) report that one-fourth of their specimens resected at operation showed well organized as well as recently formed thrombi. Hertzler (55) reported that the symptoms date from the time the affected vessels finally become obstructed, but that obvious changes exist several weeks before the onset of symptoms. In view of this and other evidence cited in the previous section on anatomy, one may conclude that the mesenteric vessels share with other vascular beds the ability to develop a collateral circulation in some instances. As in the heart and brain, often the organ depending upon the circulation is irreparably damaged in the time required for a collateral circulation to develop if major vessels are occluded.

Instances in which both mesenteric arteries and veins are occluded doubtless began as an occlusion in one vessel which spread across the capillary bed to involve the other by stagnation of the circulation. Thrombosis in a mesenteric vein does not necessarily lead to thrombosis in the arterial bed either clinically or experimentally (36, 99). Careful study of pathological material will yield a small but definite proportion (5 per cent in our series) of cases in which both arteries and veins are involved.

Obviously, blood flow within the mesenteric vessels will depend upon the blood pressure gradient. Emphasis has been given the observation of Welch (129) that when all collaterals to a segment of bowel have been ligated and the mesenteric artery gradually ligated, infarction took place when the pressure distal to the occlusion fell to one-fifth the normal level. Without benefit of experimental evidence, and based on clinical observation, Councilman (30) suggested in 1894 that the failing circulation set the stage for thrombosis in the superior mesenteric artery.

SPECIFIC LESIONS IN THE ETIOLOGY OF MESENTERIC VASCULAR OCCLUSION

In attempting to evaluate the relationship of various factors to the pathogenesis of mesenteric vascular occlusion, we will briefly discuss the states with which the disorder has been commonly associated. Changes in the blood elements and the vessels themselves must be considered.

Arteriosclerosis

Mesenteric vascular occlusion is most frequently encountered in the age range in which arteriosclerosis is common. However, proved instances known to be directly due to arteriosclerotic changes in the vessel are not plentiful.

Arteriosclerosis is a commonly named (60, 61, 81, 83, 131) vascular disorder said to be related to the onset of mesenteric arterial occlusion. There is conflicting evidence regarding the predilection of the mesenteric arterial system for the development of arteriosclerotic changes. No large amount of information has been compiled regarding the incidence and pattern of arteriosclerosis in mesenteric vessels. Cowdry (31), in an excellent treatise covering the subject of arteriosclerosis, cites Kümmel (1906) regarding this subject. The latter studied the mesenteric arteries in 42 patients more than 40 years of age, and found marked arteriosclerosis in 17. The lesions were relatively frequent, and sometimes

extreme. They were found mostly in the trunk of the artery. The peripheral branches were rarely affected, and the smallest branches within the intestine almost never. The inferior mesenteric artery was much less often involved in the process than was the superior mesenteric. In contrast to these findings is the report of Carucci (22). This investigator selected 50 autopsy subjects showing marked evidence of arteriosclerosis in the aorta, and the coronary and renal arteries. In no instance did he find any evidence of arteriosclerosis in the smaller mesenteric vessels, and in only 23 were even slight changes found in the origin of the superior mesenteric artery. Johnson and Baggenstoss (61) state that arteriosclerosis was frequently found in their autopsies. Among 8 autopsies in which gangrene of the lower extremities had occurred on an arteriosclerotic basis, the authors found 3 instances of severe atheromatous changes in the superior mesenteric artery and in one of the 3 occlusion was almost complete.

Differences in the pathological findings of various investigators notwithstanding, the fact remains that arteriosclerotic occlusion of the mesenteric arteries does occur (61, 109). Fifteen of our 42 patients showed evidence of advanced arteriosclerosis in one or more organs, but detailed reports of examinations of the mesenteric arteries at all levels were not included in our surgical pathology reports or autopsy protocols. In only one instance was a specific arteriosclerotic segment of a major mesenteric vessel found to be the cause of obstruction.

In many cases the slow development of arteriosclerosis probably protects the organism from the usual effects of mesenteric artery occlusion and there is good evidence that gradual occlusion is well tolerated (24, 30, 46, 63, 64, 119, 121). The supervention of cardiac failure as the precipitating cause of thrombosis in the presence of a particularly obstructed artery has also been alluded to. The fact that a direct cause and effect relationship between the arteriosclerosis and the occlusion did not appear in our series of patients might be explained by the fact that no case of cardiac failure was present in this group.

The indirect effects of arteriosclerosis, such as embolization from mural thrombi secondary to arteriosclerotic coronary artery disease and the detachment of atheromatous aortic plaques, are mentioned under other headings.

In summary, we may conclude that arteriosclerosis is a potent factor in a limited number of cases of mesenteric artery occlusion. Considering the widespread incidence of this degenerative disease, however, it plays a lesser role than one might expect. Incipient superimposed thrombosis, the slow development of the process, and the protection afforded by collateral channels in the face of gradual occlusion are features of arteriosclerotic occlusion of vessels which make study of the process difficult. The sheer lack of careful pathological study of the mesenteric arteries in the victims in our and most other series probably is largely responsible for the infrequency with which arteriosclerosis and occlusion are found in association.

Thromboangiitis Obliterans (Buerger's Disease)

In a report covering 948 patients diagnosed as having thromboangiitis obliterans, Horton (56) reported that no patient died of mesenteric involvement. Among 149 proved cases of Buerger's disease reported by Campbell and associates (21) only 7 "splanchnic cases" were presented, and none of these was proved. No instance was found in our series. Averbuck and Silbert (6) investigated the cause of death in a sizeable series of patients with Buerger's disease and in only one (a case reported by Buerger) was a frank thrombosis of the mesenteric vessels established.

Very often, when cases of visceral involvement have occurred in patients with Buerger's disease, postmortem examination has shown arteriosclerosis obliterans and thrombosis indistinguishable from that seen in other situations and the specific lesion is lacking (6). The case reported by Birnbaum, Prinzmetal and Conner (12), in which they found the cerebral, retinal, pulmonary, coronary, mesenteric, suprarenal, pancreatic, duodenal, hepatic, renal, and prostatic arteries as well as those of the extremities to be involved, has been challenged by Allen, Barker, and Hines (3) as representing one of disseminated arteritis. The paucity of autopsy material which may be used to support the concept of visceral involvement is demonstrated by the fact that in 1936 Cohen and Barron (26) were able to find reports of only 4 proved cases of alimentary tract involvement in the literature. Other presumptive cases have since been reported, but supporting histologic evidence is usually lacking. Abundant evidence exists showing that patients having thromboangiitis obliterans are prone to have

TABLE II.—SUMMARY OF SELECTED SERIES DEMONSTRATING THE REPORTED INCIDENCE OF CAUSES OF MESENTERIC VESSEL OCCLUSION

Author	*Arterio-sclerosis*	*Thrombo-angiitis obliterans*	*Periar-teritis nodosa*	*Embolism*	*Syphilis*	*Migrating thrombo-phlebitis*	*Portal hyper-tension*	*Sepsis*	*Recent operation*	*Polycy-themia vera*	*Post-splenec-tomy*	*Idio-pathic*	*Unknown*
Jackson, Porter Quinby (1904)	1			3				4	2			3	12
Cokkinis (1926)	1			9			10	16	2			10	22
Larson (1931)	2			6			2	11	3			6	5
Whittaker and Pemberton (1938)	8						7	7	3		8	4	
Moore (1941)				1			2					3	2
Johnson and Baggenstoss (1949)	4		3	19			2	2	12			6	
Jenson and Smith (1956)			1	10				2	5	1	1		4
DeMuth, Fitts, and Patterson	1		1	6	1			1	12		1	9	10
Total	17	0	5	54	1	0	23	43	39	1	10	41	55
Per cent	5.9	0	1.8	18.7	0.35	0	7.9	14.8	13.5	0.35	3.5	14.2	19

associated vascular occlusive lesions which do not necessarily show the typical lesion of Buerger's disease on histologic examination (1, 8, 29, 33, 59, 80, 114, 117), and it is reasonable to suspect visceral complications in the presence of this disorder. However, it is clear that thromboangiitis obliterans per se has seldom been shown to be the cause of mesenteric vessel occlusion.

Periarteritis Nodosa

Carucci (22) stated that periarteritis nodosa is the only primary vascular disease ever demonstrated to cause obstruction in the mesenteric vessels. He reported one such case. Johnson and Baggenstoss (61) reported occlusion of small mesenteric vessels in 3 patients in a group of 27 cases of periarteritis nodosa. Crawford (32) recently reported such a patient. Arkin (5) reported a 30 per cent incidence of mesenteric vessel involvement among the cases of periarteritis nodosa he studied. The demonstration by proctoscopic examination of small infarcts of the colonic membrane has been considered to be a diagnostic aid in the recognition of this disease according to Felsen (42).

A single patient in our series (University Hospital #107265) in whom mesenteric occlusion was demonstrated to be due to periarteritis nodosa presented widespread involvement of the vessels supplying the jejunum, ileum, and ascending colon. Resection was carried out and the patient was discharged from the hospital in fair condition. We do not know whether occlusions of multiple small vessels were at fault or whether an isolated superior mesenteric artery lesion was present.

Certainly, in a patient known to have periarteritis nodosa severe abdominal symptoms should lead one to suspect mesenteric artery involvement. Unless periarteritis nodosa becomes more common than it presently is recognized to be, the occurrence of the unusual occlusion of the mesenteric arteries will rarely be encountered by any single observer.

Embolic Occlusion of the Mesenteric Arteries

It would appear on superficial consideration that mesenteric artery embolism would be easy to identify. It is frequently named as the causative agent in mesenteric vascular occlusion (Table II). However, if the stringent requirements for this diagnosis such as outlined by Johnson and Baggenstoss (61) are met, many fewer cases will qualify.

These criteria are:

1. There must be a source for an embolus.
2. Clinical symptoms of sudden onset must suggest embolic phenomena.
3. The occlusion must involve but a short section of artery.
4. The microscopic appearance of the occlusive structure must suggest its embolic origin.

5. Embolic phenomena must have occurred elsewhere in the body.

It is apparent that such requirements will be met only if a majority of the cases are brought to autopsy and, therefore, we believe that less rigid criteria must be used in practice. Many reports do not indicate the means of determining that the embolism was at fault, and undoubtedly the literature does not reflect the true incidence of this entity in the over-all picture.

The authors include 6 instances (14.2 per cent of the entire series) after considering the physical structure of the occluding clot and the site of origin. Twelve cases of thrombosis and 10 cases in which the exact cause of arterial occlusion was not determined were encountered in our series.

The clinical diagnosis of embolism will usually depend primarily upon the recognition of a site of possible origin for systemic arterial emboli. The heart and aorta are the usual sites of origin; paradoxical embolization, which depends upon either a septal defect or a patent ductus arteriosus, may rarely occur. Intracardiac thrombosis is an exceedingly common complication of many diseases of the heart. Garvin (47, 48) found it at postmortem examinations in 34.4 per cent of 771 consecutive adult autopsied patients who died of heart disease. According to White (130) the most common cause of mural thrombi in the heart is myocardial infarction, fresh or old. Rheumatic heart disease and bacterial endocarditis rank second and third, respectively. Kramer (67) emphasized that coronary artery disease may go completely unrecognized by the patient; therefore, dependence upon a history of recent myocardial infarction is not justified. Detached atheromatous plaques arising in the aorta may give rise to occlusion of the mesenteric vessels. Bacterial endocarditis gives rise to emboli in a large proportion of cases. Ginsberg (50) reported 3 instances of superior mesenteric artery obstruction in a series of 250 cases of endocarditis among which emboli were manifest in 85. In a series of 300 cases of endocarditis Sperling (113) found embolism in 84 in various organs including 5 in the liver and intestine. Trotter (120) reported 3 instances of embolus of both mesenteric arteries in his group of 369 cases. It is obvious that in a disease so frequently complicated by embolization as is bacterial endocarditis, the onset of an acute condition of the abdomen should strongly suggest the presence of a mesenteric artery embolus.

TABLE III.—SUMMARY OF CAUSES OF PROVED ARTERIAL OBSTRUCTION IN SELECTED SERIES. NOTE THE LACK OF UNIFORMITY IN RELATIVE INCIDENCE.

	Mesenteric arterial obstructions		
Authors	*Embolus*	*Thrombus*	*Unknown*
Cokkinis	9	1	2
Larson	6	14	1
Johnson and Baggenstoss	19	26	6
Jenson and Smith	10	17	1
DeMuth, Fitts, and Patterson	6	6	8

Heart disease in association with mesenteric occlusion is frequently mentioned (23, 25, 61, 107, 131). A diagnosis of heart disease in some form was made in 24 (57 per cent) of our cases. Rheumatic heart disease and coronary artery disease were found in 8 and 7 cases, respectively, and accounted for the largest number of pathological cardiac states. Definite luetic heart disease was found but twice. Heart block, auricular fibrillation, and severe hypertensive changes were each found in one patient. Among our 6 cases of embolization, rheumatic heart disease was considered to be the source of the embolus in 3 and detached mural thrombi secondary to myocardial infarction in two. One case of intracardial thrombosis secondary to operative closure of a ruptured aneurysm of the sinus of Valsalva gave rise to mesenteric artery embolus. We found no case in our series which appeared to arise from a bacterial endocarditis.

Table III furnishes a comparison of the relative incidence of embolism and primary thrombosis in several reported series (61, 69). Perhaps the most striking feature in classifying cases in these series is the large number in which it was not determined whether embolism or thrombosis was at fault. In our group of arterial occlusions, the number of cases with unknown causes exceeded those known to be due either to embolism or thrombosis. As mentioned before, much of this uncertainty stems from the use of surgical material in statistical analyses; as treatment becomes more and more successful, this difficulty will in all probability be compounded.

Despite the protection afforded the mesenteric arteries by the angular take-off of the superior mesenteric artery from the aorta, and the much higher flow rate of blood down the aorta into the lower extremities, it is clear that considerable numbers of cases of embolization do

occur. Except for those surgical accidents in which the vessels are injured or ligated, it seems likely that embolization affords the most apparent of all causes, without the necessity for considering other possible factors in the etiology of mesenteric vessel occlusion.

Syphilis

Syphilis as a cause of mesenteric vascular occlusion is rare. Although the disease has a decided predilection for involvement of the aortic media with subsequent aneurysm formation, it is far less commonly found to involve the smaller arteries. When smaller arteries are involved, the vasculitis consists of an adventitial inflammation which may progress to the formation of a highly vascularized connective tissue which narrows the lumen—the so-called "obliterative endarteritis" of syphilis (101). Before syphilis may be incriminated as a cause of vessel blockade, the histologic features must be demonstrated. A positive serological test for syphilis, so far as is known, cannot in itself be construed as evidence that mesenteric occlusion has resulted from this infection. Actual syphilitic vasculitis of the superior mesenteric artery was demonstrated in but one of our cases (Table II); 4 patients had positive serological tests for syphilis. Serological determinations were not done in 26 of our subjects.

Little is mentioned in the literature regarding syphilis in relation to venous involvement. Syphilis as a cause of mesenteric venous thrombosis has been described by Simmonds (110), Pfifferling (91) and Klemm (65). Degeneration and exudation within the vein walls with subsequent fibrosis of the liver is described by these authors. In contradistinction to the arterial vasculitis, it apparently may occur in either the hereditary or the acquired form of syphilis. In the case of arterial involvement, the characteristic cardiovascular changes are usually found in cases of late acquired syphilis (92).

It is unlikely that luetic infection will ever account for more than an occasional case of mesenteric vessel obstruction. The literature which dates back before the days of the highly effective chemotherapeutic treatment of syphilis is almost devoid of examples. The over-all reduction in the incidence of the complications of syphilis made possible by available treatment will probably further reduce all forms of cardiovascular syphilis.

Mesenteric Venous Occlusion and Migrating Thrombophlebitis

No patient in our series was known to have had a history of migrating thrombophlebitis. However, in a recent report, North and Wallenman (86) called attention to 3 cases of mesenteric thrombosis in the course of migrating thrombophlebitis. Sir James Paget (90) first reported the condition and since that time numerous reports (7, 11, 13, 43, 49, 68, 82, 86, 115, 116) have appeared recording an aggregate of 17 such cases. Of the visceral vessels likely to be involved, apparently the pulmonary vessels are the most susceptible. The mesenteric vessels are said to rank next in frequency in visceral involvement. Adrenal involvement is also known to occur in a significant proportion of cases (43).

A history of antecedent migrating thrombophlebitis in superficial veins should lead to the suspicion of mesenteric vein thrombosis in the presence of acute abdominal symptoms. The long periods of quiescence between episodes of superficial phlebitis and mesenteric involvement (often 15 years or more (11, 16)) make the pursuit of an accurate history in suspected cases obviously worthwhile. By definition, the affliction is limited to the venous side of the circulation, and if arterial involvement is demonstrated it is likely that one is dealing with thromboangiitis obliterans. The early thromboses are characteristically relatively inoffensive, and the usual proceeding picture is one of wide dissemination of lesions over a long period of time. The cause of the episodic thromboses remains an enigma. It is probable that the difficulty is complex and likely entails both abnormalities in the clotting mechanism (Berry and Bougas) and vascular injury. So far as mesenteric vein involvement is concerned, although it is infrequently encountered, the previous history will assist in diagnosis. There is nothing in the pathologic material examined which differentiates this thrombotic process from that seen in other situations (43), and the site of origin, whether in large or small vessels, has not been determined from the limited amount of pathologic material available (11).

Portal System Thrombosis Associated with Portal Hypertension

Portal cirrhosis is clearly the most common predisposing cause of portal hypertension.

Thrombosis of the portal vein and its tributaries is a rather frequent complication of cirrhosis (15). Schiff reports a 2 per cent incidence of portal vein thrombosis in cases of cirrhosis and Johnson and Baggenstoss (62) reported that 25 per cent of their cases of mesenteric vein occlusion were related to some form of portal obstruction. For many years Banti's syndrome was believed to be a primary hematosplenic disorder that secondarily caused changes in the liver. It is now known that Banti's syndrome is not a disease entity but merely represents a severe congestive splenomegaly due to any extrasplenic obstructive venous disorder (16, 102). The obstructive cause is usually hepatic cirrhosis (39, 69, 81). The confusion arising from the erroneous concept of the disorder inevitably led to confusion in reporting related entities of which portal and mesenteric vein obstruction is but one phase. In the light of present knowledge it is evident that much that was written concerning splenic anemia and Banti's disease in relationship to portal bed thrombosis, indeed applies to any obstructive venous disorder that results in splenomegaly. The unclassified cirrhoses, schistosomiases, and specific portal vein disorders (45, 54, 72, 96) may be included under some circumstances.

The important role of hepatic cirrhosis in portal system thrombosis associated with portal hypertension is demonstrated by the fact that in Evans' (39) series of portal and splenic vein thromboses, cirrhosis existed concomitantly in 66 per cent. Of the 10 patients reported on by Reich (97), all had cirrhotic changes in the liver, and in 3 the superior mesenteric vein was involved. If the cases in which splenectomy was performed for splenic anemia are combined with those demonstrating hepatic disease, 15, or 25 per cent, of the 60 cases reported by Whittaker and Pemberton fell into this group.

Mention should be made of the relationship of schistosomiasis to cirrhosis. The hepatic irritation and direct venous involvement caused by this parasite sets the stage for cirrhosis and portal vein block. This parasitic (fluke) infestation affects large segments of the world population. The Schistosoma mansoni (West Indies, Africa) is responsible for intestinal bilharziasis, the Schistosoma japonicum (Orient) invades the vessels of the intestines and other organs, giving rise to cirrhosis, and the Bilharzia hematobia infests the veins in virtually all abdominal viscera in about one-quarter of the Egyptian population. The venous involvement associated with cirrhosis makes the likelihood of major thrombosis considerable.

Shifts in populations may cause the complications of schistosomiasis encountered in North America to be far more frequent than they now are. This is especially true in view of the Puerto Ricans and Latin Americans entering this country. Pons (94), writing from Puerto Rico, states, "so much is the hepatosplenic pathology a part of the disease caused by the S. mansoni that we can find no justification for its being termed 'intestinal schistosomiasis' ". Plaza Izquierdo (93) states that in Venezuela Banti's syndrome is almost always due to the Schistosoma mansoni. These observations, considered in the light of the known relationship of schistosomiasis to portal tributary thrombosis (41, 66), indicate that clinicians should be aware of the possibility of mesenteric vein occlusion when treating patients from endemic areas.

The evidence indicates that the impediment of blood flow is the major factor in promoting thrombosis, but the fact that as many as one-third of the patients so afflicted have associated thromboses (97, 128) at distant locations suggests that other factors, now unknown, may function. Massive progression of the process in a centripetal fashion has been described by Cabot (20) in which a thrombus beginning in the superior mesenteric vein eventually involved the portal, splenic, and pancreatic veins. The inferior vena cava was also involved.

It is evident that portal hypertension, usually as a result of portal cirrhosis, figures prominently in the development of thrombosis of the portal system. The past literature may be confusing in view of the confusion in terminology, but consideration of data supplied by case protocols and pathologic descriptions leads to the conclusion that portal vein obstruction, portal hypertension, and mesenteric venous thrombosis are related in a significant number of cases.

Sepsis

Intraperitoneal sepsis is one of the most frequently reported forerunners of mesenteric thrombosis. When it occurs the veins are usually involved (27, 52, 81, 131). The infection reaches the mesenteric veins from the bowel wall and, in the older literature at least, the septic ap-

pendix was the most commonly reported site of origin. A "septic arteritis" was found to be the cause of arterial obstruction in 2 cases of a series of 72 reported by Johnson and Baggenstoss (61). Only one case in our series developed following acute appendicitis, and no other case was known to present a septic process before the onset of clinical symptoms with the exception of one, that of a woman whose arm was amputated for gas gangrene 3 days earlier. The influence of infection in the cases in which operation has previously been done cannot, of course, be ascertained. Abdominoperineal resection, perineorrhaphy, prostatectomy, and other procedures are certainly often associated with bacterial invasion of denuded areas. Although not commonly associated with severe clinical infection, these operations result in denuded areas in contaminated fields which might easily offer a portal of entry for bacteria into the portal system of the veins. Abdominoperineal resection, prostatectomy, and pelvic floor repair preceded mesenteric thrombosis at least in one case each in our series.

The marked prevalence in the literature of proved instances of mesenteric venous occlusion in association with septic intraperitoneal processes points strongly to a cause and effect relationship. This association seems to have been far more striking in the preantibiotic era, and at this time sepsis does not figure so prominently among the causes of vascular occlusion.

Operation as a Cause of Mesenteric Vessel Occlusion

Except in those instances in which direct injury of a major mesenteric vessel occurs at operation, it is usually difficult to be sure that the operation, and not the condition for which operation was performed, was to blame for the mesenteric vessel occlusion. Statistical confusion is inevitable if only the fact that previous operation had been performed is considered. Blakemore (14) reported the cases of 3 patients who developed mesenteric vein thrombosis following portacaval anastomosis. Postmortem study demonstrated that in 2 cases cavernomatous changes existed in the portal vein and in the third case an ascending thrombophlebitis arising in the hemorrhoidal veins was at fault. Splenectomy, especially when done in the presence of portal hypertension, is an excellent example of a situation in which a large number of factors may be responsible. Their separation may defy the most diligent clinical and postmortem examination.

It is a fact, however, that mesenteric vascular occlusion does frequently follow in the wake of a surgical procedure. Twelve of the patients included in our series had recently been subjected to operation. In 7 abdominal operations had been performed, in one a thoracotomy, and in one a herniorrhaphy. An aortogram was followed in 2 days by lumbar sympathectomy and then after 3 days by laparotomy for massive gangrene (arteries and veins involved) in another patient. Amputations had been done in 2 patients. In 3 of our subjects, emboli had been removed from other major vessels within a few days of the onset of the abdominal symptoms.

No doubt many cases of mesenteric vessel obstruction are to be found in protocols relating to many operations for diverse conditions. Our perusal of the literature, however, furnished no pattern which was even vaguely consistent in demonstrating that certain operations were more apt to be followed by this complication than others if consideration for the basic disorder was given. We did have the impression, however, that radical surgery was more often so complicated than minor surgery. Mesenteric vessel occlusion ranked only second to renal complications as a cause of death following resection of the head of the pancreas in the Mayo Clinic experience recently reported by Waugh and Giberson (127). Jenson and Smith (60) reported that nearly 20 per cent of their cases followed major abdominal operations. McClenahan and Fisher (79), Johnson and Baggenstoss (61) and Whittaker and Pemberton (131) also report previous operations in a large proportion of their cases. E. A. Graham (52) stated, "As a postoperative complication it (mesenteric thrombosis) occurs most frequently after septic appendicectomy." Although this is not borne out in ours and many other series of cases, it is possible and likely that the advent of chemotherapy has changed this picture since this was written in 1930. The proportional increase in radical operations in the past 2 decades likewise would tend to diminish the proportion of cases which follow appendectomy.

Seybold and Musgrove (107) and Laufman and Scheinberg (71) reported a case of thrombosis following novocaine block of the lumbar sympathetic ganglia and ablation of a lumbar sympathetic chain. Whether the complication

was fortuitous is not known. Our case in which previous lumbar sympathectomy and aortography had been done may have resulted from the irritation of the radiopaque medium injected 5 days earlier.

In 2 cases reported by Lober and Lillehei (76) and in an earlier case reported by Sealy (106) attention is called to an interesting complication following surgical correction of coarctation of the aorta. These workers reported that extensive panarteritis, which Lober and Lillehei claimed to be indistinguishable from periarteritis nodosa, immediately followed the operative correction of coarctation of the aorta. Apparently these changes occurred only in the area below the coarctation, and in all of the cases the mesenteric vessels were severely involved. They postulated that the changes were due to the sudden increase in blood pressure in the involved areas. This interesting observation may shed light upon the etiology of periarteritis nodosa, as suggested in earlier experimental work (9, 18, 132) in animals.

The indications are that mesenteric vessel occlusion will continue to follow operative procedures frequently. As the evolution of surgical techniques occurs, no doubt new conditions will arise which will set the stage for this complication. Although circumstantial evidence, as in the case of coarctation repair, may point strongly to a cause and effect relationship between the operation and the vascular occlusion, the lack of suitable experimental methods at this time precludes proof in most instances.

Blood Disorders

Polycythemia vera. Although our series contains no known example of polycythemia vera, this condition is often mentioned in the literature as a cause of mesenteric thrombosis. Intra-abdominal vein thrombosis as a complication of polycythemia has been reported frequently enough to warrant suspicion of the condition when a polycythemic patient presents himself with acute abdominal pain (19, 28, 58, 85, 88, 112). This complication of polycythemia cannot be considered common, because Norman and Allen (85) and Burris and Arrowsmith (19) collectively found only 4 cases among 166 patients having this dyscrasia. The 2 cases reported by Norman and Allen presented hepatic vein thromboses and are therefore not directly to be considered in this discussion.

The secondary polycythemia seen in the cyanotic group of patients with congenital heart malformations may be associated with embolic phenomena (44), but usually this occurs by paradoxic embolization and often pulmonary emboli exist as well. Usually the pulmonary embolism precedes the visceral or peripheral embolic episode, probably because the high right heart pressure resulting from the pulmonary artery occlusion forces the clot from the right to the left heart.

The increased number of circulating erythrocytes probably plays the major role in the tendency toward thrombosis, but clinical evidence (134) suggests that other factors may also be responsible. Dameshek (35) reports that platelet counts of 1,000,000 per cubic millimeter are not unusual in polycythemia vera, and he states that in some cases the count may exceed 3,000,000. Although there is little direct substantiating evidence, it is possible that the elevated number of platelets might be responsible to some extent for the thrombotic tendency.

Postsplenectomy state. One result of splenectomy is an increase in the number of circulating platelets which may occur within a few hours after splenectomy. This increase is often more striking in thrombocytopenic purpura than in other conditions (123, 124). Another feature of the postsplenectomy state following splenectomy for portal hypertension, which occurred more frequently in the days before the introduction of shunting operations for portal hypertension, is the stasis of portal blood as the result of the increased venous pressure. Although platelets may increase from three to five times the normal levels after splenectomy, it is difficult to separate the influence of these and other factors in explaining the occurrence of thrombosis in the mesenteric vessels (2, 5). Why is thrombosis of the portal vein and its tributaries not more frequent following splenectomy especially when increased numbers of circulating platelets and portal hypertension coexist? Our series contains only one such instance, but the existence of a severe concomitant abdominal gunshot injury involving the left kidney, pancreas, adrenal gland, and lung makes the connection with splenectomy uncertain. Whittaker and Pemberton (131) report 7 cases following splenectomy for splenic anemia. Platelet counts were not given and thus the importance of their increase cannot be definitely stated.

Despite the fact that rises in the circulating platelets frequently occur after splenectomy, mesenteric thrombosis as a complication of splenectomy is not common. When it does occur, sepsis, associated pancreatitis, or hepatic disease are often present, which in themselves may be largely at fault.

Idiopathic Intravascular Clotting

Most reported series of cases of mesenteric vascular occlusion will contain considerable numbers of cases in which the cause has not been determined. In a discussion of agnogenic venous mesenteric thrombosis Berry and Bougas (11) call attention to the importance of the clotting mechanism per se and advise that heparin be used postoperatively, as did Gordon and MacKenzie (51) and d'Abreu (34). It is doubtful that an increased coagulability exists as an isolated defect (77), but the combination of tissue damage and circulatory stasis is apparently sufficient to displace the clotting-anticlotting balance to favor coagulation. A better understanding of the mechanism of blood coagulation will be necessary before a full appreciation of the importance of defects in relation to intravascular clotting is known. However, when defects are suspected a few relatively simple laboratory procedures (coagulation time, prothrombin time, hematocrit, clot retraction time, and platelet counts) can be done for diagnosis and follow-up care.

It is probable that more careful search for the cause of venous mesenteric thrombosis will considerably decrease the proportion of cases described as "primary" or idiopathic. Whether the concept of retrograde venous embolism, as formulated by Woloschin (133) and later described by Reich (96) in 2 cases, removes a group of patients from this category, is doubtful. Of Cokkinis' group of 57 instances of venous thrombosis only 4 were considered to be primary or idiopathic. At this time we must admit that modest numbers of cases will fall into this category despite the fact that insufficient search for a cause and a lack of understanding of the basic principles of the clotting mechanism are responsible for a large number of cases included.

Miscellaneous Causes

Many causes of mesenteric vessel occlusion which depend upon mechanical obstruction of the intestine are encountered in the literature. Strangulated hernia, intussusception, and volvulus are the most notable among these. This group is dismissed herewith; suffice it to say that the cause of venous and arterial thrombosis is obvious, and occasionally progression will occur to cause death. This brief treatment of this aspect is not intended to imply that obstructive intestinal disorders are not an important cause of mesenteric vessel occlusion. Often the operation or the intestinal obstruction is blamed as being the cause and vice versa. Thus the literature is somewhat confused.

In the miscellaneous category will be found interesting curiosities. Many of the cases included here are well documented. The small number of cases preclude statistical evaluation, and separate consideration under individual headings is avoided.

Trauma (1, 16, 36, 37, 125) leading to mesenteric vessel injury is known to cause mesenteric vessel occlusion. Excessive ingestion of alcohol (23, 37), fatigue, prolonged emotional strain (53), ergot ingestion (10), and visceral allergy (118) have been claimed to be causative factors in mesenteric vessel occlusion.

A case demonstrated to arise on the basis of Whipple's intestinal lipodystrophy is reported by Rives and his associates (99). Lupus erythematosis as the cause of mesenteric venous occlusion has been reported (47). General debility, chronic enteritis (36), the ingestion of digitalis, and the administration of antibiotics have been mentioned as significant causes; they have not been proved to be of any importance.

The considerable attention given specific arterial diseases in this communication stands in striking contrast to the very few references to primary venous disease. Primary venous occlusion is rare and, when it does occur, phlebosclerosis is its cause (16, 45, 54, 72, 97). Thrombosis of the mesenteric veins as part of the picture of migrating thrombophlebitis, considered separately before, is not considered by us as belonging to this group.

The cases falling into the group under this heading, except those with accompanying strangulation obstruction, are few. This list of causes is incomplete, but from a statistical standpoint it is also unimportant.

SUMMARY

An attempt has been made to determine the relative importance of the various recognized

causes of mesenteric vascular occlusion on the basis of the authors' experience and the pertinent literature. It would appear that embolization (usually resulting from thrombi arising in the left heart), portal obstruction, arteriosclerosis, and idiopathic venous occlusion are the most common causes of mesenteric vessel obstruction. Periarteritis nodosa, migrating thrombophlebitis, and intraperitoneal sepsis form an intermediate but much less common group. It should be added that sepsis, once a very important cause of mesenteric thrombosis, has only in recent years become much less common. Rare causes include thromboangiitis obliterans and syphilis. The relative importance of operation, the post-splenectomy state in particular, is difficult to determine. A group of interesting miscellaneous causes are mentioned.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Major Resection of Scalp and Skull for Cancer with Immediate Complete Reconstruction; 14 Cases. JOHN C. GAISFORD, DWIGHT C. HANNA, and ANTHONY F. SUSEN. *Plastic & Reconstr. Surg.*, 1958, 21: 335.

THE AUTHORS from the departments of Plastic and Reconstructive Surgery, and Neurosurgery, Division of Surgery, University of Pittsburgh School of Medicine present 14 unusual cases seen over a period of 5 years. They state that initially poorly chosen or inadequate treatment is usually responsible for the progression of malignant disease.

These 14 cases of serious well advanced carcinoma of the scalp and skull required radical surgery for cleanliness and survival. The treatment in each case was individually planned, but basically each required wide resection of the diseased area down to the exposed skull and underlying dura. Shifting of flaps of the scalp to cover the exposed bone and dura, with replacement of the scalp defect with a split graft, proved to be the best one stage treatment. Neck dissection was done in continuity in some cases. The most common lesion was recurrent squamous cell or basal cell carcinoma with postirradiation changes.

Ten of the 14 individuals are alive although their follow-up is relatively short. Careful selection and good judgment are the most important factors in securing successful results.

The results of this simple logical procedure have been most encouraging. The average hospital stay was 18 days. —*Henry S. Patton, M.D.*

EYE

Primary Skin Grafting After Exenteration of the Orbit. LYALL R. MCLAREN. *Brit. J. Plast. Surg.*, 1958, 11: 57.

THE AUTHOR describes a surgical technique for obtaining early healing in exenteration of the orbit by combining the exenteration with primary grafting.

Exenteration is performed in the usual manner and bleeding is stopped by coagulation diathermy or packing the orbit with gauze wrung out in warm saline or adrenaline solution. A stent mold is then made of the exenterated orbit and a thin split-thickness skin graft 6 by 3 inches is taken from the hair-free surface of the thigh or upper arm. The mold is lubricated with liquid paraffin, and the graft draped over it, raw surface outward. The graft and impression are inserted into the orbit and the graft is sutured to the skin edges of the defect by sutures of No. 000 silk, leaving the ends long. Excess skin is trimmed and stored by refrigeration. The mold is then removed and the sheet of skin is left, lining the orbital cavity closely. The graft-lined cavity is packed firmly with short lengths of gauze wrung out in saline solution and opened out. The completed dressing is anchored in place by overtying the ends of the silk sutures, over which is placed a moist dressing and bandage.

The first dressing is taken off in 7 days under general anesthesia, when the overtied sutures and the dressing which has become dry are removed. Usually it will be found that the graft has taken well in its entirety; doubtful areas are excised and replaced with small squares of the refrigerated stored graft. The dressing is replaced, and the orbit is dressed again 3 days later. The dressings are discontinued 14 days after the operation.

In 10 cases of orbital exenteration this procedure was used in 8; in 2 cases skin grafting was performed with Thiersch grafts used as squares on vaseline gauze. In 9 cases healing was complete within 14 days; in one case healing took longer.

The 10 cases comprised 7 malignant melanomas of the globe or conjunctiva, one retinoblastoma, one reticulosarcoma, and one sarcoma of the orbit. When it is possible to leave the periosteum and the fatty pad near the apex of the orbit there is no difficulty in obtaining a perfect take. The operation, performed in this manner, shortens the convalescent period significantly, eliminates the need for painful dressings over a long period of time. A satisfactory prosthesis may be fitted at an early date. —*Ray K. Daily, M.D.*

Prognosis in Glaucoma Surgery. PER RIISE. *Am. J. Ophth.*, 1958, 45: 807.

THE AUTHOR discusses the long-term prognosis of glaucoma surgery. Glaucoma simplex occurs slightly more frequently in men than in women—666 to 391 in this series of cases, and in this country 503 to 497 in the year 1950 for individuals 50 to 70 years of age.

For more than 5 years the author observed a total of 148 patients with 189 eyes upon which glaucoma operations had been performed. In 117 of these patients the second eye became affected during the observation period.

The importance of early operation is confirmed, especially for retention of the visual field.

In the 2 groups with unrestricted and with moderately restricted visual fields immediately before the operation, the loss in visual field after 8 years was very moderate (on the average of 7 per cent of the complete visual field) and every eye retained serviceable function.

In the 2 groups with loss of more than one-half of the visual field before operation the prognosis was poorer. Eighteen of 26 eyes and 6 of 13 eyes in these groups retained some useful visual function.

Full retention of visual acuity for a number of years cannot be expected. During an average of 8 years the loss of visual acuity in all groups measured about 20 per cent of full visual acuity. This appeared to be due to a special kind of cataract, the increase in refraction being due to swelling of the nucleus of the lens.

During the observation period of 8 years, of 83 eyes with refraction recorded at the last examination, 32 (38.5 per cent) had an increase in refraction of at least 2 diopters, the average increase being 4.5 diopters. Sixty-nine per cent of the eyes with a loss of more than 2 lines on the Snellen acuity chart (18 of 26) belong to this group, and lens opacities were recorded at the last examination in this same number.

Glaucoma surgery does not appear to be the only cause of these lenticular changes in cases of progressive myopia after operation for glaucoma. Similar changes have been found in the second eye, even if glaucoma had not been operated on or no glaucoma was present. However, the degree as well as the frequency of the process seems to be higher in eyes operated upon for glaucoma. However, an especially low postoperative intraocular pressure is not the cause of these lenticular changes.

It is concluded that patients operated on for glaucoma may not retain full visual function, but surgical regulation of the pressure at an early stage of the condition provides a very good chance for retention of useful visual function for a period of at least 8 years.

—Joshua Zuckerman, M.D.

Dietary Treatment of Myopia in Children. P. A. GARDINER. *Lancet*, Lond., 1958, 1: 1152.

BECAUSE THE rate of visual deterioration in myopic children seems to coincide in time and degree with spurts of physical growth, Gardiner presents the possibility that rectification of the apparent imbalance of growth and nutrition might diminish deterioration of the eyesight.

It has been found that hypermetropia in a growing animal can be reduced by limiting the protein content of the diet (Gardiner and MacDonald, 1957).

Increase in myopia is greater and commoner among children who refuse animal protein in their diet than among those whose tastes are more catholic. Moreover, myopic children whose eyes are deteriorating eat less food for every pound they increase in weight than do children of normal weight or myopic children whose eyes are not deteriorating.

The eyesight of 2 groups of myopic school children was examined and compared.

The control group of the myopic children was observed for 6 months at an ordinary school clinic. The treated group of nearsighted children was observed at the research clinic at Guy's hospital.

A diet was devised to enable the child to take 10 per cent of his caloric intake as animal protein. Children with an obvious antipathy to animal protein were given casilan (calcium caseinate) as a supplement.

Each child was seen 2 or 3 times throughout the year and the diet adjusted to keep the balance at the optimum level.

There was a big difference between the treated and untreated groups at all ages, in the rate at which the myopia deteriorated. In the younger children deterioration was greater in the controls by 0.5 diopter per annum. In the older children the process was all but arrested in the treated group. The more severe the myopia at the start of treatment, the bigger was the difference between the treated and untreated groups.

The biggest increase in an individual child was 2.3 diopters in a year in the untreated group and 1.6 diopters in the treated group. In general, the treated group deteriorated at about a third of the rate of the untreated group.

Those who took the most protein deteriorated least, and those over 12 years of age did better than those under this age.

In 3 of 4 subgroups of those over 12 years the mean degree of myopia improved.

It is concluded that whatever may be the cause of acquired myopia in children and adolescents, its course can be beneficially modified by the dietary means described, although other factors involved still need elucidation.

It appears that milk plays an important part in the control of myopia and that some part is played by the vegetable protein intake. The diet must be assessed accurately both as to the calories yielded and as to the constituents. *—Joshua Zuckerman, M.D.*

Pterygium Excision. HUMBERTO ESCAPINI. *Am. J. Ophth.*, 1958, 45: 879.

THE AUTHOR describes a method of excising a pterygium which has yielded better results than McReynold's procedure, buccal mucosa grafts, corneal grafts, or excision with sliding or free conjunctival flaps.

Escapini's operation consists of removal of the pterygium and plastic repair of the defect in the bulbar conjunctiva.

The head of the pterygium is shaved from the cornea and the superficial corneal layers are removed with it up to the limbus.

From the upper and lower edge of the pterygium at the limbus, 2 incisions are made in the bulbar conjunctiva, converging to a point temporal to the center of the plica, or of the caruncle if the plica is not present.

The head of the pterygium is picked up with forceps, the subconjunctival tissue is dissected to the bare sclera and as far superiorly, medially, and inferiorly as possible. The dissected tissue is carefully excised with scissors, care being taken to avoid injury to the medial rectus muscle.

The conjunctival defect is repaired, two basic principles being kept in mind, namely, that healthy con-

junctiva must be brought in to cover the defect and that an area of bare sclera must be left between the edge of the conjunctiva and the limbus.

If the defect is small the conjunctiva is undermined upward and downward, and its borders sutured together with interrupted No. 6-0 catgut. The first suture is placed 4 mm. from the limbus and anchored to the superficial sclera, a triangular area of sclera being left bare.

If the defect is of medium size a conjunctival flap is made and pulled down to partially cover the defect. A No. 6-0 catgut suture is passed near the border of the conjunctival defect and through the superficial sclera, 3 mm. from the limbus. An almost vertical incision is made in the upper part of the bulbar conjunctiva, starting at the edge of the defect 4 mm. from the limbus, and the conjunctival flap is undermined. The tip of this flap is fastened to the episclera and the suture is passed through the lower edge of the conjunctiva, 3 mm. from the limbus. Several more sutures are placed to join the sliding flap to the lower conjunctiva. The suture passed through the edge of the conjunctival flap anchors it to the episclera and 2 or more sutures are placed where needed to close the conjunctival wound. In this way a small rectangular area of bare sclera is left.

If the defect is large 2 conjunctival flaps are required.

Escapini's method is considered surgically sound because it removes all affected tissue, conjunctival as well as subconjunctival; because normal conjunctiva is brought in to cover the defect left by the excision; and because an area of bare sclera is left between the limbus and the edge of the conjunctival flap.

Among 180 cases in which this operation was a primary procedure there were only 2 recurrences.

—Joshua Zuckerman, M.D.

Effect of Fungistatic Agents on Corneal Infections with Candida Albicans. JEROME A. MONTANA and THEODORE W. SERY. *Arch. Ophth.*, Chic., 1958, 60: 1.

THE AUTHORS evaluated anterior segment toxicity, anterior chamber penetration, and the therapeutic possibilities of nystatin (Squibb) and amphotericin B (Squibb) in experimental Candida albicans infections of the rabbit cornea. These are fungistatic agents derived from the Streptomyces and they have little antibacterial activity. Nystatin is insoluble in water but amphotericin B is soluble; both are stable when kept dry, cold, and in the dark, but rapidly lose activity in moisture.

Consistent corneal infection with Candida albicans could be produced only by the intralamellar injection of 10^5 cells (or greater) and with the aid of steroid injection either simultaneously or for periods of up to 2 weeks prior to the introduction of the organisms.

Nystatin was used in saline suspension or dissolved in propylene glycol and added to an ointment base for topical instillation. Amphotericin B was dissolved in 5 per cent glucose for use by (a) instillation, (b) subconjunctival injection, and (c) intravenous injection. Subconjunctival nystatin produced excessive local reaction in doses above 800 units, but drops of 100,000 units/ml. were well tolerated. Amphotericin B (5 mgm./ml.) caused no reaction when given subconjunctivally or in drops. Aqueous bio-assay showed no significant antibiotic following any of these routes with intact or abraded eyes.

Nystatin ointment begun within 4 hours of infection prevented the development of any corneal infections, but when treatment was delayed 48 hours the infection progressed violently as in the untreated control eyes. Amphotericin B given by subconjunctival injection was ineffective, but local drops given within 24 hours of innoculation prevented infections; treatment when delayed as much as 72 hours was of no effect. These drugs appear to be potent when promptly employed, but ineffective in these circumstances against established infections of the rabbit cornea with Candida albicans. *—Arthur H. Keeney, M.D.*

Experiences with an Anterior Chamber Lens. A. LIEB and DUPONT GUERRY, III. *Am. J. Ophth.*, 1958, 46: 127.

THE AUTHORS describe a new technique for inserting plastic lenses in the anterior chamber following cataract extraction. The new procedure is less traumatic than one previously described. The indications and contraindications, the operative technique, and the results obtained in 29 cases of unilateral aphakia are discussed in detail. In 27 cases, the lens was implanted several weeks following removal of a cataract. In 2 cases, the lens was implanted immediately after an intracapsular cataract extraction.

—J. Jack Stokes, M.D.

The Use of Plastic Lenses in the Anterior Chamber; Indications, Technique, and Personal Experience in 125 Cases. JOAQUIN BARRAQUER. *J. Internat. Coll. Surgeons*, 1958, 29: 629.

THE AUTHOR discusses the introduction of plastic lenses into the anterior chamber.

The functional results of the insertion of a plastic lens into the retroiridic space (Ridley's operation) are not always satisfactory, and the good vision obtained soon after operation generally diminishes as a result of opacification and wrinkling of the posterior capsule or loss of binocular function on account of the development of slight myopia (due to displacement of the plastic lens by retraction of the posterior capsule).

Barraquer recommends the introduction of a modified Strampelli lens into the anterior chamber for the following types of cases:

1. Aphakia. After a normal intracapsular or extracapsular extraction, in secondary cataract with posterior synechiae, and in aphakia with total iridectomy, even if the vitreous is prolapsed into the anterior chamber.

2. Nonprogressive high myopia. In monocular cases to correct the anisometropia, and in binocular cases to improve visual conditions.

3. High hypermetropia.

It is important to ascertain the refractive power, the distance between the cornea and the correcting lenses set in the trial frame, and the diameter of the anterior chamber.

Two lenses are made with 0.5 mm. difference in length in order to permit selection of the more suitable one at operation. The radius of curvature of the nonoptical part of the lens is 13 mm.

The procedure followed in inserting the lens varies with the status of the eye.

a. In an eye that has been operated on by intracapsular extraction. The inclusion is performed 2 or 3 months later, when the state of refraction is established. After general relaxation, ocular hypotony, topical anesthesia, and good miosis are obtained, the superior rectus muscle is fixed at the external quadrant, a corneal incision is made (with a keratome) and enlarged with scissors. The incision must be entirely corneal so that the extremities of the lens, once placed, do not come into contact with the incision.

The lens is gently slid into the anterior chamber without pressure on the eyeball, without injury to the corneal endothelium, and without hooking the pupil, and it is left in a horizontal position. The incision is sutured. If the iris has a tendency to pass in front of the lens, air is injected into the anterior chamber.

b. In an eye after extracapsular extraction. If a peripheral iridectomy has not been done previously it must be done now. If the posterior capsule is complete, a superoexternal incision is made with a cataract knife, and a peripheral iridectomy is performed at 12 o'clock. Although miosis is useful, it is not obligatory in this type of case.

If secondary cataract is present, capsulotomy should not be done at this time but 10 or 15 days later, and if posterior synechiae are present, causing an updrawn or hammock pupil, a small iridectomy can be performed along with the capsulotomy with a keratome for the incision and by passing de Wecker's scissors underneath the lens to cut the posterior capsule.

c. In eyes with total iridectomy. Hypotony is of the utmost importance in this type of case. The conjunctiva is dissected at the limbus to create a conjunctival flap, and a corneal incision is made "ab externo" with a keratome and enlarged with scissors. The lens is then inserted. If the vitreous prolapses it is cut off at the edge of the wound. Air is injected into the anterior chamber.

e. In the nonaphakic eye. A wide incision is made in the superoexternal quadrant and a small peripheral (basal) iridectomy is performed, with certainty that the pigmentary layer of the iris is not left behind. The lens is placed horizontally.

The size of the lens is important. If it is longer than the diameter of the anterior chamber, a small cyclodialysis or a depression of the iris root may occur with secondary pupillary deviation and small zones of partial iris atrophy; if the lens is too small it changes position, and trauma and goniosynechiae may be the result.

In the author's series of 125 cases the results were as follows: 6 incidents, 2 accidents, 11 complications, and 2 serious complications.

—*Joshua Zuckerman, M.D.*

Operation for Cataract as an Office Procedure. RENALD CHING. *J. Internat. Coll. Surgeons*, 1958, 29: 429.

THIS IS AN INTERESTING ARTICLE concerning 70 consecutive operations for cataract performed in the author's office. Economic factors concerning the patients and limited hospital facilities prompted this investigation to determine whether such a procedure could be carried out in the office with any greater risk than in the hospital.

Generally, the patients would walk a considerable distance immediately after surgery, often up and down stairs and in crowded streets. The author considers that the results were good on the whole; probably, under the circumstances, they might be considered amazing.

The author does not advocate the use of this procedure by everyone. He only states that it can be done and with reasonable safety. While this report is not likely to change the existing methods of surgery, it is interesting to read.

—*Andreas V. Mortensen, M.D.*

Macular Edema, Papilledema, and Optic Atrophy After Cataract Extraction. ROBERT B. WELCH and JACK C. COOPER. *Arch. Ophth.*, 1958, 59: 665.

THIS ARTICLE deals with the entities of macular edema, papilledema, and optic atrophy which occasionally follow apparently uneventful cataract surgery, and presents a review of the literature on this subject.

Among 1,600 ward cases there were 18 cases in 21 eyes which were presented and analyzed in detail. The eyes were divided into four groups: group 1 consisted of 7 eyes with only macular edema or cystic degeneration, group 2 consisted of 9 eyes with macular edema and papilledema, group 3 consisted of 4 eyes with only papilledema, and group 4 consisted of 3 eyes with optic atrophy.

The clinical appearance of macular edema following cataract extraction is identical to the lesion of so-called central serous chorioretinopathy in phakic eyes. However, histologic examination in phakic eyes reveals that there is no true edema of the macula but rather a serous detachment from Bruch's membrane. The etiology of this condition is thought by many to be a choroidal vascular disturbance. Accordingly, the authors think that the term "serous detachment of the macula" would probably be more appropriate than "macular edema following cataract extraction."

The state of the vitreous may be of prime importance in the development of macular edema. Thus, macular edema and associated peripapillary edema may be precipitated by a ruptured vitreous face, particularly when there are vitreous adhesions to the wound. Such vitreous abnormalities may produce changes at the posterior pole by creating traction at the macula and disc. Possibly, the abnormal state of the vitreous may produce vasomotor instability in the vessels of the choroid. The authors think that possibly hypotony is associated with macular edema. In 3 of the cases, iridocyclitis seemed to have been a noteworthy feature in serous detachment of the macula.

Papilledema was thought to be related to hypotony, particularly if this condition was severe and of long duration and if it produced a marked vascular response at the disc. Prognosis for vision was found favorable when the macular detachment was transient, but macular cysts and degeneration may result if the serous detachment persists for several months. When visual loss is due to papilledema from hypotony, visual acuity may be restored when tension returns

to normal and the papilledema disappears. Obviously, optic atrophy carries a poor prognosis for vision. —*Andreas V. Mortensen, M.D.*

Vitreous Implant in Retinal Detachment; A Study of 50 Consecutive Vitreous Operations. DONALD M. SHAFER. *J. Kentucky M. Ass.*, 1958, 56: 438.

THE AUTHOR bases the rationale for using vitreous in retinal detachment on several factors.

The anatomic basis is indicated because the retina has only two attachments—at the optic nerve and ora serrata. Thus, it is believed that further necessary support comes from the vitreous and any loss of vitreous volume would predispose to retinal detachment.

The physical basis for the use of vitreous is associated with preventing surge of the vitreous. It is thought that many retinal detachments are preceded by a vitreous detachment so that a highly viscous mass is surrounded by a less viscous fluid. Therefore, the introduction of vitreous should reduce the surge of the patient's own vitreous and reduce the likelihood of subsequent detachment.

The surgical basis for vitreous injection is simply to increase pressure, which will push the retina back against the choroid and aid successful reattachment.

A fourth basis for vitreous injection is that it seems to eradicate fixed retinal folds and vitreous bands.

Vitreous was obtained for this study of 50 cases of vitreous implant from enucleated human eyes, 6 to 48 hours after enucleation. These were eyes unsuitable for corneal transplantation but in which no neoplasm, intraocular infection, or positive serology was present.

The technique of implanting 4 c.c. of donor vitreous is briefly described. A discussion of the results and complications is presented.

The procedure resulted in the reattachment of the retinas in 48 per cent of the eyes, all previous failures following the usual surgical techniques.

—*Andreas V. Mortensen, M.D.*

Tissue Reaction to Implants. WILLIAM B. BARRY. *Arch. Otolar.*, Chic., 1958, 67: 660.

THE AUTHOR has buried various implants between the periosteum and freshened bone over the dorsum of a dog's nose. In a brief summary of the literature to date, he draws the following conclusions which are confirmed by his own experiments.

1. Autogenous rib and septal cartilage lives and is one of the best implant materials for grafts to the dorsum of the nose of human beings.

2. Autogenous bones make a suitable material for implants in the nose, but require adequate immobility and bone contact for at least 21 to 30 days.

3. Implants of all other material are less satisfactory and some are undesirable.—*Henry S. Patton, M.D.*

NOSE AND SINUSES

Tumors of the Nasal Fossa, Accessory Sinuses, and Upper Jaw (Tumores de las fosas nasales, cavidades anexas y maxilar superior). OSVALDO EMHART L. *Rev. otorrinolar.*, Santiago, 1957, 17: 18.

THE AUTHOR presents a review of the various clinical aspects and therapeutic procedures recommended for tumors of the nasal fossa, accessory sinuses, and upper jaw. The benign neoplasms are listed and classified, and electrocoagulation is recommended for treatment in most instances. Cavernous hemangiomas of the lateral walls of the nose presenting an invasive character should receive preliminary radiotherapy and then surgery. Also the basal fibroma may respond to the application of radium and electrocoagulation, surgery being rendered difficult because of hemorrhage and difficulties in approach. Cysts may also be removed surgically.

The poor results of the treatment of malignant tumors in these regions are due to poor visibility and inaccessibility, the tumors usually remaining unrecognized until they are far advanced. Treatment is frequently insufficient and inadequate. Success will depend upon early diagnosis. Following a discussion of the symptoms and the importance of Broder's classification with regard to treatment, it is emphasized that tumors of less marked malignancy are radioresistant and respond better to electrocoagulation, while the more malignant types respond better to radiotherapy. Other factors influencing the choice of treatment include age, physical condition, extent of the lesions, and the presence or absence of metastases. For old debilitated subjects irradiation is preferable. In rare instances malignant tumors of the nose and sinuses in advanced stages will give rise to metastases in the cervical glands.

Following a classification and discussion of the symptoms and course of malignant tumors of the nasal fossa, together with their glandular propagation, it is concluded that malignant tumors of class 4 of Broder's classification are best treated with the implantation of radium or radon needles, or external irradiation. Those of less marked malignancy may respond to electrocoagulation, and if their limits are not well defined to radon insemination.

In malignant tumors of the upper jaw and sinuses it is necessary to define 3 stages in development; namely, (1) the initial intrasinusoid stage with vague and indirect symptoms of the closed cavity, (2) the stage of deformation with destruction of the walls of the sinusoid cavity, and (3) the stage of exteriorization toward the orbit, and maxillopharyngeal space. The topographic classification of tumors of the upper jaw includes tumors of the infrastructure, the mesostructure, and the superstructure. The histologic classification is similar to that of tumors of the nasal fossa and the path of glandular metastases is described.

Tumors of the infrastructures include chiefly epitheliomas and, less frequently, sarcomas, cylindromas, and degenerated adamantinomas. Malignant tumors of the alveolar margin may be readily extirpated or subjected to electrocoagulation. The surgical defect can be easily repaired with prostheses. General anesthesia by intubation is recommended. Involved glands should be extirpated with subsequent irradiation of the involved area.

Malignant tumors of the maxillary sinus comprise chiefly epitheliomas and sarcomas. Following a brief description of their symptoms and course, attention is drawn to the importance of their differential diagnosis from chronic sinusitis, benign tumors, and pseudotumoral forms of certain specific inflammatory lesions

such as syphilis, tuberculosis, or actinomycosis. The best results are obtained by a combination of therapeutic methods, and the relative advantages of surgery, electrocoagulation, and radiotherapy are discussed. Prostheses should be applied only after many months following treatment, when recurrence can be excluded.

For malignant tumors of the ethmoid sinuses surgery is usually recommended by various routes according to individual indications. For very malignant tumors local radon is preferable, and for less malignant tumors, electrocoagulation and local radiotherapy. Malignant tumors of the frontal sinus are extremely rare, only some 40 cases having been described in the literature. The treatment includes surgery and x-rays. Also primary malignant tumors of the sphenoid sinus are rare and treatment is only palliative. Tumors of the maxillary sinus invading the ethmoid will yield only 10 per cent of recoveries, whereas tumors without involvement of the maxillary sinus yield 30 per cent of cures, while the best results were obtained in tumors of the infrastructures (60 per cent).

In conclusion, the author reports his own results in 17 cases of malignant tumors, principally adenocarcinomas of the ethmoid and pavement carcinomas of the maxillary sinus with secondary invasion of the ethmoids and neighboring structures. His treatment consisted chiefly in surgery with total resection of the upper jaw and ethmoids and occasional orbital evacuation of the affected side, followed by radiotherapy. Only 4 of his patients survived the 2 year period of observation, these being patients with tumors of the lower structures and one of the maxillary sinus proper. The poor results are attributed to various factors; namely, (1) late diagnosis due to slight symptoms or failure of the specialist to examine carefully for insignificant initial symptoms; (2) lack of co-ordination between the various institutions, laboratories, and doctors equipped to treat these special conditions; (3) lack of facilities for radiotherapy, radon contact therapy, or electrocoagulation; (4) too long a lapse of time between definitely positive biopsy and surgery, giving rise to disseminations and secondary infections, and (5) a decision of inoperability of patients who could indubitably have been benefited by operation, even though extensive intervention might have been indicated. Here it should always be remembered that the mutilation occasioned by the surgeon is always less than that resulting when the tumor is left to its own devices. —*Edith Schanche Moore.*

MOUTH

The Management of Secondary Cleft Lip Deformities. KERWIN M. MARCKS, ALLAN E. TREVASKIS, MEREDITH J. PAYNE, and JOHN E. KICOS. *Am. J. Surg.*, 1958, 95: 932.

THE AUTHORS present a series of cases illustrating the methods employed in dealing with the management of secondary cleft lip deformities. They stress the importance of "prevention" in dealing with these types of deformities and the importance of utilizing the full value of the Cupid's bow and skin-vermilion ridge. They are of the opinion that a full prolabium and skin-vermilion ridge will add considerable length to the horizontal diameter of the lip and prevent a tight lip which would detract from the final result. It is their feeling that the prolabium should be part of the lip, and should not be distorted or sacrificed at the initial bilateral lip repair.

The mild deformities which involve the skin and mucous membrane can be corrected by simple adjustment in the skin-vermilion ridge section or in the floor of the nostril. A V-Y advancement or a Z-plasty in the horizontal plane is usually sufficient to correct many of these conditions.

In the moderately severe deformities, the principle in treatment is basically the same as in the milder deformities; however, the amount of operative surgery necessary to produce the same effect is greater. These deformities usually require re-opening of the lip and the floor of the nostril.

In the classification of severe deformities, the authors place those cases in which marked deformity persists and in which readjustment of material still available will be required. Extra tissue is often necessary to produce the desired result either in the form of a full thickness graft or by an Abbe switch flap from the lower lip.

The authors stress the fact that the final result will not depend upon surgery alone. They believe that the ancillary services, such as dental care, the work of speech pathologists, and the care given by psychologists, are very important in the complete rehabilitation of the patient. —*Frank W. Pirruccello, M.D.*

Multiple Symmetrical Tumors in the Oral Cavity (Ueber multiple symmetrische Tumoren in der Mundhoehle). VOLKMAR HAENSELT and HELMUT FLOCK. *Arch. Geschwulstforsch.*, 1958, 12: 352.

A DETAILED DESCRIPTION is given regarding the development of the following four separate and symmetrical tumors in the oral cavity of a patient during a 5 year period: (1) neuroma on the left edge of the tongue, (2) and (3) melanocytoblastoma in each tonsil, and (4) melanocytoblastoma on the right edge of the tongue. These findings brought out some interesting points—that in spite of the rarity of melanocytoblastomas in the oral cavity, they do occur in multiple form, that the location is symmetrical, and that there is development of melanoma in preblastomatose melanosis on the right edge of the tongue. The growths were genetically considered to be primary tumors and developed from peripheral nerve tissue. —*Oscar E. Hallberg, M.D.*

Primary Salivary Gland Tumors. DUANE L. LARSON and ERWIN R. SCHMIDT. *Surg. Clin. N. America*, 1958, August, p. 981.

THE MAJOR GROUP of salivary glands consists of the parotid, submaxillary, and sublingual glands. The minor group is made up of small collections of salivary tissue located mainly in the oral mucosa.

About 65 per cent of primary salivary tumors are benign, and the vast majority consists of mixed tumors. Most salivary tumors are located in the parotid gland. Females are affected almost twice as often as males as far as benign tumors are concerned but the distribution of malignant tumors is about

equal between the sexes. Benign tumors are more frequent between the ages of 30 and 69 years and malignant tumors find their peak of incidence between 50 and 79 years.

The benign lymphoepithelial lesion of the parotid gland (Mikulicz's disease) appears to be inflammatory rather than neoplastic. The prognosis is good either with surgical treatment or irradiation.

Superficial lobectomy is recommended for benign tumors located in that lobe. If the tumor is situated in the deep lobe of the gland sacrifice of the lower division of the facial nerve or one or more of its main branches may be required. Total parotidectomy is advocated for malignant tumors with preservation of the seventh nerve if feasible. No compromise in the resection of parotid tumors because of the fear of seventh nerve paralysis is permissible.

—*W. C. Huffman, M.D.*

Surgical Parotitis. R. K. GILCHRIST and J. R. MCANDREW. *Arch. Surg.*, 1958, 76: 863.

SURGICAL PAROTITIS is an acute inflammation of the parotid gland occurring most frequently after surgical procedures. It is relatively rare but very important clinically since it carries a high mortality rate and is thus regarded as a grave prognostic sign.

People who develop parotitis are usually seriously ill, in poor general condition, dehydrated, undernourished, and with poor oral hygiene. The highest incidence follows abdominal or genitourinary tract surgery. The infection is almost always caused by the Staphylococcus aureus organism which is thought to invade by the hematogenous route or ascending infection of Stensen's duct. The latter view is most widely held today.

The diagnosis is made by finding an enlarged, tender gland usually 4 to 6 days after operation. The first symptom is pain in the temporomandibular joint with a febrile response of 102 to 103 degrees within the first 24 hours along with a high leucocyte count.

Early treatment consists of mouth washings and stimulation of the salivary secretion by hard candies. Determination of abscess formation by fluctuation is difficult because of the dense parotid fascia. Because of this difficulty in diagnosis, the resulting scar of the face, and the fear of injury to the facial nerve, incision and drainage have often been delayed. Radium and x-ray therapy have been used since 1924.

The authors report 7 cases of surgical parotitis in the past 2 years, whereas previously there had not been a case since 1941. All of the patients but one were acutely ill following extensive intra-abdominal surgery. All were receiving antibiotics when the parotitis developed. Antibiotic-resistant Staphylococcus aureus organisms were found in 4 of the cases in which organisms could be cultured. All patients were treated with x-rays, 75 roentgens to the gland tissue daily, within the first 12 hours after the onset of symptoms. One patient responded to x-ray therapy alone within 48 hours.

In the 6 other cases in which the pain and swelling were increasing after 48 to 72 hours despite x-ray therapy, a decompression under local anesthesia was performed in the operating room. A hockey stick incision was started just anterior to the ear and extended 1 inch to a point just below the angle of the mandible and then forward and parallel to the mandible 1 to 1.5 inches farther. The parotid capsule was then split a distance of 1 to 2 inches without incision of the gland. The parotid capsule was markedly thickened to 2 to 3 mm. No pus was obtained by needle aspiration in any case. The wound was loosely packed with iodoform gauze and warm compresses were applied for 2 to 3 days. Relief from pain was almost immediate with marked reduction of the swelling within the first 3 to 4 hours. Recovery occurred in 3 to 4 days with no abscess formation. Postoperative scarring was minimal. No further x-ray therapy was given after the surgical procedure.

—*James M. Brooks, M.D.*

PHARYNX

Acute Epiglottitis in Childhood; A Serious Emergency, Readily Recognized at the Bedside. WILLIAM BERENBERG and SHERWIN KEVY. *N. England J. M.*, 1958, 258: 870.

EPIGLOTTITIS due to group B Hemophilus influenzae is an acute respiratory infection characterized by an abrupt onset, a fulminating course, and rapidly progressing respiratory obstruction caused by an edematous, swollen, cherry-red epiglottis. Prostration occurs and there is a high mortality. Acute epiglottitis is considered a medical emergency requiring immediate therapy beyond that which might ordinarily be employed in the management of croup, acute pharyngitis, or laryngotracheobronchitis with which it is frequently confused.

The authors review their experience with 42 children observed from 1946 to 1954. The patients ranged in age from 3 months to 14 years and the average age was 4 years. Cases preponderantly occurred between November and May. The abrupt onset is demonstrated by the fact that 22 children had been ill for less than 8 hours before hospital admission and 3 patients were dead on arrival, having been ill for less than 6 hours. Extreme throat pain was impressive. There was striking retention of secretions with visible and copious puddling of pharyngeal mucus, irritability, marked restlessness, difficulty in breathing, hoarseness, audible wheezing, definite stridor, croupy crow, and temperatures ranging between 100 and 105°. Twelve of 39 patients presented a typical picture of shock with pallor, cyanosis, prostration, and varying degrees of loss of consciousness. Physical examination of the chest was negative except for evidence of diminished breath sounds indicating poor air exchange. The most striking physical finding was the cherry-red epiglottis seen at the base of the tongue. The patients were placed in a cool humidified atmosphere.

Tracheotomy was performed on 18 patients. The life-saving value of tracheotomy is emphasized by the fact that although it was performed only on indication of sufficient respiratory obstruction there were no deaths in the 18 patients so treated and the 5 deaths in this series might have been prevented by early tracheotomy. It is a current practice to treat the disease with chloramphenicol given intramuscularly in doses of 100 mgm. per kilogram of body weight for the first 24 to 36

hours and to reduce this dosage to 50 mgm. per kilogram given orally if it can be tolerated. It is emphasized that a diagnosis can be made at the bedside by the observation of a cherry-red epiglottis seen at the base of the tongue. —*Allan D. Callow, M.D.*

NECK

Functional Aspects of Experimental Thyroid Grafts (Aspetti funzionali degli innesti sperimentali di tiroide). E. MACCHITELLA, A. FAZIO, and F. AGOSTINACCHIO. *Chir. pat. sper.*, Milano, 1958, 6: 152.

EXPERIMENTAL OBSERVATIONS in transplants of endocrine tissues seem to suggest that a specific hormonal deficiency in the host is a basic requirement for successful grafting. The authors review the opinion of several investigators on the role of peroxidase in the formation of thyroid hormone as well as their own previous observation that the amount of peroxidase present in the thyroid epithelium is related to the functional state of the gland. Total thyroidectomy was performed in 40 rats, and autoplastic and homoplastic grafts of the thyroid lobes were placed in the subcapsular space of the spleen and kidney. The animals were sacrificed after 30 days and the areas of grafting stained by the method of Tardini to demonstrate the peroxidase reaction and by the usual hematoxylin and eosin method.

A good take was obtained in 85 per cent of the autoplastic and 30 per cent of the homoplastic grafts. The thyroid follicles were well formed, lined by cubical and occasionally by tall cylindrical epithelium, and filled with colloid. The splenic grafts showed a predominance of microfollicles and a richer network of interfollicular capillaries. The renal grafts presented a larger peroxidase content in the tubules surrounding the thyroid graft than in the graft itself. The peroxidase granules appeared as fine inclusions, abundant in the rare cylindrical cells and minimal where the follicular epithelium was rather flat. No peroxidase was noted in the colloid. The splenic grafts, in comparison, revealed a more scanty peroxidase content while the enzymatic activity was abundant in the red, and negligible in the white, splenic pulp surrounding the grafts.

The authors conclude that in this experiment thyroid grafts were anatomically and functionally successful and that the peroxidase activity of the grafts was evidence of functional take. Studies now in progress in the same institution have shown radioactive iodine uptake in grafts that were obtained under the same experimental conditions.

—*Franco Sangalli, M.D.*

Diagnostic Errors and Pitfalls in the Treatment of Thyroid Diseases (Diagnostische Irrtuemer und Behandlungsfehler bei Schilddruesenerkrankungen). PAUL HUBER. *Chir. Prax.*, 1958, p. 89.

THE AUTHOR'S STUDY is based on a total of 17,000 operations on the thyroid gland which were performed between 1945 and 1956.

The presence of a struma may be overlooked if its location is intrathoracic, intratracheal, or if marked scarring is present from previous operations. The intrathoracic struma is of very little practical importance. If it cannot be diagnosed by palpation, it will be found on the roentgenogram. The intratracheal struma is rare, which seems to be the reason that its presence is often overlooked. In many cases it is associated with a normal goiter. The most important aid in diagnosis is a laryngologic examination. To prevent errors in diagnosing an intrathoracic or intratracheal struma it is advisable to have (1) inspection and palpation, (2) roentgenograms of trachea and esophagus, and (3) the aforementioned laryngologic examination.

Difficulty in breathing may be the result of recurrent struma, laryngeal stenosis due to bilateral paralysis of a recurrent nerve, tracheal stenosis due to scar formation, or may have a cardiovascular or pulmonary origin. If there is more than one cause for the dyspnea, the most important one should be treated first. If a recurrent struma is the only cause, a reoperation should be done. At such an operation it is most important to carry out a complete bilateral exploration of the remaining thyroid gland.

Branchiogenous cysts without any involvement of the thyroid or marked enlargement of lymph nodes due to tuberculosis or lymphogranuloma may give the impression of a struma. If this should be present on only one side, it could be misdiagnosed easily as a malignant goiter. In all of the aforementioned cases an operation would not do any harm and would only manifest the diagnosis. It would be very different, if an intrathoracic struma was believed to be present and the operation should show that the condition was actually an aneurysm. This diagnostic error should be avoided by all means because of the resulting complications at operation.

In several cases the complaints of a patient may be misdiagnosed and the presence of the struma may be overlooked. On the other hand if a large thyroid gland is present, symptoms from the surrounding areas may be misinterpreted. In this way an esophageal diverticulum or carcinoma of the esophagus may be overlooked. In many cases a benign struma will be diagnosed as malignant and the other way around. In the author's experience the first occurs most often. Also metastases may be misdiagnosed. Lymph nodes of the neck in young patients may already present metastases from carcinoma of the thyroid which cannot be palpated. Such a case is not so rare as it seems to be; however, it is more unusual to have bone metastases from a malignant struma diagnosed as benign bone cysts.

The presence of a calcification in the thyroid gland does not contraindicate the presence of a malignant condition. Recurrent attacks of high fever may also occur in cases of rapidly growing sarcoma. In rare cases malignant conditions of the thyroid gland are present with thyrotoxic symptoms.

—*Frank R. Lichtenheld, M.D.*

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS; CRANIAL NERVES

Etiologic Study of 109 Fatal Cases of Spontaneous Intracranial Hemorrhage. A. B. M. Sison and G. B. Castillo. *J. Philippine M. Ass.*, 1958, 34: 141.

This article is devoted to the study of 109 patients admitted to, and autopsied at, the U.P.-P.G.H. Medical Center. These patients were among the 83,000 patients admitted to this Center during this period. The etiologic factors found were as follows: (1) rupture of an intracranial aneurysm in 8 cases, (2) hemorrhage from an arteriosclerotic blood vessel in 60, (3) hemorrhage secondary to infections in 3, (4) hemorrhage from blood dyscrasia in 10, (5) brain tumors in 9, (6) eclampsia in 3, and (7) miscellaneous renal conditions in 4; the etiology was not determined in 9 cases.

It is rather interesting that in 7 of the 8 patients with cerebral aneurysms the aneurysm occurred in the middle cerebral arteries and in 1 patient, it occurred in the basilar artery. No attempt was made to classify these into congenital or atheromatous aneurysms; however, the authors mention that other workers believe that such differentiation may not be valid since so-called congenital aneurysms might be of atheromatous origin. In 4 of these cases there was moderate to severe arteriosclerosis of the cerebral vessels, and in the other 4 there was minimal arteriosclerosis. In all of the cases there was some extension of the hemorrhage into the intracerebral substance and intraventricular extension occurred in 6 cases. In no case was a subarachnoid hemorrhage the cause of death.

Although arteriosclerosis was considered the etiologic factor of the hemorrhage in 60 patients, 58 had an associated hypertension. Both of the 2 patients without hypertension had severe arteriosclerosis. Fundoscopic examination had been performed in some of the patients before death, but it was impossible to predict or forecast the possibility of a cerebral hemorrhage by this means as has been suggested by some workers. Although other conditions such as bronchial pneumonia and heart failure contributed to the death of some of the patients, it was nevertheless thought that the hemorrhage alone was the primary cause of death in 93 of the patients.

—*Jack I. Woolf, M.D.*

A Follow-Up Study After Thorotrast Carotid Arteriography. A. Berrett and D. L. McRae. *Canad. M. Ass. J.*, 1958, 78: 916.

The authors studied 134 patients who had been subjected to thorotrast carotid arteriography 5 to 22 years previously.

The most frequent complication in the series was thorotrastoma of the neck. Three of the 134 patients died of cancer other than brain tumor. These represented as diverse forms of cancer as found in any groups of the population, and the frequency was no greater than would be found among individuals of similar age and sex followed up for an equal period of time. The minor hematological changes noted in 2 patients were not considered conclusive.

The authors drew no definite conclusions from the small number of cases studied with regard to significant increase in cancer of the liver or spleen, or in leukemias. They pointed out that study of a larger series would be essential for more adequate evaluation of the entire problem.

It was concluded that thorotrast is an extremely useful substance for the study of the long-term effect of small quantities of internally deposited radioactive material. In view of its extremely long half-life, long-term follow-ups would be essential for the study and evaluation of this substance. To quote the authors, "As our patients have been followed up for an average of only 12.5 years, the present communication should be regarded as a preliminary one. Its value will obviously be considerably enhanced if the patients at present alive are followed up in order to determine the cause of death." —*Joseph Ransohoff, M.D.*

The Angiographic Evaluation of Cerebral Atherosclerosis. Maurice Tatelman. *Radiology*, 1958, 70: 801.

In a study of 200 consecutive cases of "stroke" or "cerebral vascular accident," each being studied by carotid or vertebral angiography, or both, the author uncovered a surprising number of patients whose obvious causative lesion was cerebral atherosclerosis. In spite of the generally supposed dangers of angiography in this class of patient, there was only one untoward reaction in the entire series, all of the patients being subjected to the percutaneous injection of hypaque, and many of the studies being bilateral.

Complete occlusion of the internal carotid artery was found in 10.5 per cent of the patients, of the anterior cerebral artery in 7.5 per cent, of the middle cerebral artery in 4.5 per cent, and of the vertebrobasilar arteries in 2.5 per cent. Fifty-eight per cent of all the 200 patients showed some evidence of cerebral atherosclerosis. Partial occlusion of the internal carotid artery was the cause of the "stroke" in 10 per cent of the patients, and the narrowing of the artery just distal to its origin in the neck, together with the bizarre outline of the remaining channel, is fairly pathognomonic of this lesion.

Some patients who originally had partial carotid occlusion returned to the hospital some months later with complete occlusion and the severe and expected neurologic results. The author therefore emphasizes that proper surgical attack upon a partially occluded vessel should be considered as soon as such evidence is seen. Narrowing of the lumen, elongation of a segment of artery, extreme tortuosity, local dilatation, or straightening of a segment are all arteriographic signs of atherosclerotic changes in cerebral vessels, just as they are in vessels elsewhere in the body.

—*John Martin, M.D.*

Thrombosis of the Internal Carotid Artery. EDWIN CLARKE and PHILLIP HARRIS. *Lancet*, Lond., 1958, 1: 1085.

THE AUTHORS report that cases of occlusion of the internal carotid artery have presented many clinical pictures. Frequently, however, the signs and symptoms pointed to an intracranial space-occupying lesion.

Five cases were presented, 4 diagnosed as cerebral neoplasms and one as a cerebral abscess. It is suggested that the early symptoms were caused by carotid artery insufficiency, and that intracranial hypertension was produced by eventual brain softening and accompanying edema.

The signs and symptoms, as well as the results of x-ray, electroencephalogram, and cerebrospinal fluid studies, closely resembled those of a space-occupying lesion. However, certain definition was accomplished by carotid angiography.

Review of the literature and the authors' personal experiences confirmed the fact that occlusion of the carotid artery may result in an incorrect diagnosis of cerebral neoplasm, cerebral abscess, or traumatic intracranial hemorrhage.

The authors concluded that operation on the artery seemed to be the only hope for treatment. They stress early diagnosis, which will result in more effective treatment. —*Joseph Ransohoff, M.D.*

Visual Field Changes Produced by X-ray Treatment of Pituitary Tumors. MAX CHAMLIN. *Brit. J. Ophth.*, 1958, 42: 193.

OUT OF A TOTAL of 180 patients with pituitary tumors, the author selected 40 which he observed during x-ray therapy and for a reasonable period thereafter. He excluded patients who were treated primarily by surgery and those in which no visual field involvement was present. If the neurosurgeon elects radiotherapy as the treatment of choice, careful ophthalmologic examination is continued throughout the treatment as well as beforehand. His attention is directed to central visual acuity as measured by the Snellen chart and the field of vision. In testing central visual acuity the patient should be given ample time and generous encouragement to read as much of the chart as he can. Peripheral fields are examined with greatest efficiency with 2/330 white and 1/2,000 white. The latter field is extremely useful for detecting early and minimal defects due to chiasmal interference and has been found to show chiasmal interference earlier and more extensively than peripheral field examination. When examinations are performed frequently enough the 1/2,000 field alone is satisfactory. The charting of the fields is illustrated in the accompanying figures.

The protocol for visual examination during x-ray therapy is outlined, beginning with re-examination within 24 hours of the first x-ray treatment. Thereafter, examinations are made depending upon the development of alterations in the visual fields, and at any time during the examinations if field encroachment takes place radiotherapy may be altered. If visual loss continues despite carefully controlled therapy, surgery should be considered. Other lesions responsible for the failure of roentgen therapy include meningioma, pituitary carcinoma, aneurysm, chordoma, and craniopharyngioma. The author tabulates his results of therapy in terms of central acuity, central visual field, and peripheral visual field. The results in each category of all 40 cases are tabulated. Among the functional areas studied 28 per cent demonstrated no alteration in acuity; 62 per cent were improved and 9.6 per cent showed deterioration. Evaluating the over-all effect of therapy, visual function was maintained or improved in 90.2 per cent and loss occurred in 9.6 per cent. It was found that in only 4 of the 40 patients studied was operative treatment eventually found necessary.

Sufficient time elapsed following the completion of therapy to permit the conclusion that whereas in some cases improvement might occur during therapy, in others it might not occur until some months after therapy was completed. In 44 per cent of the cases improvement occurred during the first year following the beginning of therapy and in 37 per cent during the second year. Some improvement occurred even during the third and fourth year after therapy started. It was recommended that if no serious visual loss threatens the patient at least 4 to 6 months should be allowed to elapse after the completion of therapy before concluding that no improvement will take place. At least 2 to 3 years must elapse before judging the total amount of the improvement.

—*W. Eugene Stern, M.D.*

The Causes and Surgical Treatment of Intratemporal Facial Paralysis. L. B. W. JONGKEES. *Germ. M. Month.*, 1958, 3: 77.

THE AUTHOR, from the University of Amsterdam, Holland, reviews the anatomy of the facial nerve, in particular, that portion within the temporal bone which divides the latter into the labyrinthine segment, the tympanal or horizontal segment, and the vertical segment extending from the knee down to the stylomastoid foramen. He discusses the inadequacies of the previous methods of topical diagnoses of the site of facial nerve lesions following the scheme of Erb, emphasizing that disturbances of lacrimal secretion, hyperacusis, and disturbances of taste are not reliable in indicating the site of the lesion. The mechanism of the paralysis more reliably indicates the site of the disease process. This, together with x-rays in the Stenvers and Schuller projections, may permit accurate diagnosis. The various causes of paralysis in a total of 184 patients who were hospitalized for facial paralysis are itemized. Nine patients had acute otitis media, 15 skull fracture, 19 chronic otitis media, 80 postoperative paralysis from surgery on the temporal bone, 53 Bell's palsy. The paralysis was due to other miscellaneous causes in 8.

Approximately one out of 200 cases of acute otitis media is associated with facial paralysis. Treatment of the otitis is usually associated with cure of the palsy. The incidence of facial paralysis in chronic otitis media is slightly greater; 19 patients encountered in this category were treated by decompression and a radical mastoid operation, and 6 by nerve grafting.

If recovery does not start before the end of the eighth week in paralysis due to skull fracture, inspection of the nerve is imperative. Decompression was performed in 9 cases and nerve graft in 4 cases. When

the onset of facial palsy after skull fracture is delayed, spontaneous recovery often takes place.

Of the 80 patients treated for postoperative facial palsy incident to a mastoid operation or antrotomy, 15 recovered spontaneously. In 32 nerve grafting was performed, and decompression was carried out in 33 patients.

Among the patients with Bell's palsy, inspection of the diseased nerve in cases of fresh lesions has indicated that the disease in a great majority is in the vertical part of the nerve between the bend at the posterior end of the horizontal semicircular canal and the stylomastoid foramen. The nerve is red and swollen and upon histologic examination degeneration is found. A vascular origin appears probable. If, after daily electrical and general treatment of no more than six weeks, the condition remains unchanged, surgical treatment is advised. Nerves with increasing or recurrent paresis should be decompressed. Fifty-three patients have been treated along these lines. Good results were obtained in 7 cases without operation and decompression was performed in 46.

In general, the surgical management of the nerve within the temporal bone depends upon whether the nerve is in continuity or has been severed. If in continuity, as in patients with Bell's palsy and in most cases of posttraumatic paralysis of delayed origin, it suffices to clear the nerve of all surrounding tissues, to open the fallopian canal at the site of the lesion, and to cut the sheath of the nerve. If the nerve has been severed it is rarely possible to unite the ends. It may be possible to reroute the nerve in its curved portion and gain approximately 10 mm. in this fashion by lifting the nerve out of its canal, but because of the unavoidable damage to the blood supply and the structures of the middle ear, rerouting is seldom used. Rather, careful apposition of freshly cut stumps of the facial nerve with nerve grafts obtained from the lateral cutaneous, auricular, or long thoracic nerves gives very good results. Amniotic membrane has been used to cover the nerve after grafting.

The results of treatment are better if surgery takes place within the first six weeks. In paralyses of longer duration results are less favorable. The end result may take up to one year to be realized. The foregoing applies to decompressive procedures when the nerve is in continuity. Nerve grafting never gives complete recovery but in fresh cases approximately 80 per cent show success. Recovery sets in after 6 to 10 months but occasionally it may occur 2 years after operation. Tabulation of the results is given.

Decompression:	
Complete recovery	50%
Minor evidence of asymmetry	22%
Good improvement	22%
No improvement	6%
Nerve Graft:	
Greatly improved, but with some asymmetry	35%
Good improvement	45%
Little or no improvement	20%

The author emphasizes the need for massage, electrical stimulation of the muscles, and exercises of the facial musculature to maintain the muscles in good condition. —*W. Eugene Stern, M.D.*

Follow-Up Studies in Chemopallidectomy for Paralysis Agitans. MANUEL RIKLAN and LEONARD DILLER. *J. Am. M. Ass.*, 1958, 167: 13.

THIS STUDY was based on a questionnaire follow-up of 141 consecutive patients with paralysis agitans who underwent the chemopallidectomy operation, and was compared with that of a control group of 173 patients who were evaluated at the same clinic but not operated upon. The patients in the control group as a whole averaged 10 years older than those in the operative group.

Although surgery consisted of chemical ablation of either the globus pallidus or in some cases the ventrolateral nucleus of the thalamus, the differences in results between the two methods were not evaluated or studied.

From the questionnaire it is thought that 89 per cent of the patients undergoing operation had maintained improvement on the operated side, whereas only 10 per cent of the control group were benefited under medical management. "The improvement for the patients operated on, in general, was limited to the side of the body on which operation was done. Thus, while for both groups the illness itself apparently progressed, the operation had evidently stopped the development on that side of the body."

—*Jack I. Woolf, M.D.*

SPINAL CORD AND ITS COVERINGS

Arterial Vascularization of the Spine (La vascularisation artérielle de le moelle). G. LAZORTHES, J. POULHES, G. BASTIDE, J. ROULLEAU, and A. R. CHANCHOLLE. *Neurochirurgie*, Par., 1958, 4: 3.

THE AUTHORS describe the various zones of vascularization of the spinal cord and divide them into a superior segment corresponding to the cervical cord and the first two or three dorsal segments. The first area is well vascularized and is dependent upon three or four arteries and an inferior segment which corresponds to the lumbosacral area and two or three lower dorsal segments. The latter area is also well vascularized but is dependent upon a single vessel. There is an intermediate zone corresponding to the middle dorsal segments in which vascularization is relatively poor.

They have studied the anterior central spinal arteries and have paid attention particularly to the variations in their caliber in the various zones. They believe that their study has clarified the pathogenesis of certain spinal affections, particularly insofar as they correspond to certain areas of the cord. The vascular factor is very important in traumatic compressions of the cord due to tumors and in various myelopathies. The neurological surgeon should pay as much attention to the vascular supply of the spinal cord in spinal operations as he does to the vasculature of the brain in intracranial operations. Many of the spinal cord complications of diseases of the abdominal and thoracic aorta can be explained, as well as the difficulties which arise from aortography, by the anatomy of the vessels.

The article is well illustrated with reproductions of both injection and corrosion studies.

—*Nicholas Wetzel, M.D.*

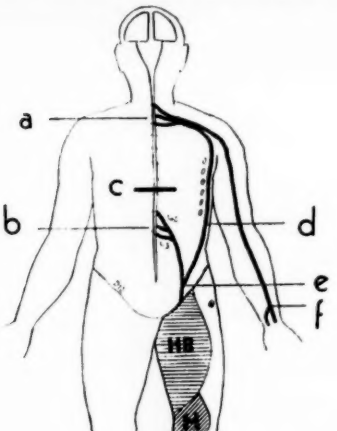

FIG. 1. (Oppolzer). Neurological findings in patient 2 years after operation. *a*, Brachial plexus, *b*, lumbar plexus, *c*, site of section of spinal cord, *d*, ulnar nerve transferred to *e*, *e*, end-to-end suture of transverse section of femoral nerve and ulnar nerve, *f*, lateral implantation of the peripheral end of the ulnar nerve into the median nerve. In area *HB* sensation in both the hand and leg are experienced, and in area *H* sensation in only the hand is experienced.

Results of Transplantation of the Ulnar Nerve into the Lumbosacral Plexus for Transverse Injuries of the Spinal Cord (Ergebnisse der Ulnarisverpflanzung in den Plexus lumbosacralis bei Querschnittslaesionen des Rueckenmarkes). R. OPPOLZER. *Wein. med. Wschr.*, 1958, p. 437.

IN 1945 the author first mentioned the possibility of transplanting the ulnar nerve into the lumbosacral plexus in paraplegic patients. As a result of this operation he believed that the new growing neurite of the ulnar nerve would make possible the return of some sensation and possibly some motion (Fig. 1). He also thought that in paraplegic patients this operation would result in the return of bladder sensation and function of the lower bowel.

So far the author has operated upon 2 patients, who were completely paraplegic due to accident. In both cases there was a partial return of sensation in some localized areas. No definite conclusions, however, can be drawn from these 2 patients.

The operation was carried out as follows: After the patient was placed in the left or right kidney position, a flank incision was made, following the twelfth rib. After separation of the muscles the incision was deepened, avoiding injury to the peritoneum, Further blunt dissection was carried out lateral to the psoas muscle so that L3 and L4 could be visualized. The next step of the operation was a complete mobilization of the ulnar nerve from the wrist up to the axilla. After the ulnar nerve was completely free, an esophagoscope was placed from the flank wound along the anterior border of the latissimus dorsi so that the scope could appear in the axilla. With a special forceps the distal end of the nerve was clamped and it was pulled through the esophagoscope. After removal of the instrument an end-to-end anastomosis to the femoral nerve was carried out. Both wounds were closed in the usual manner. The position of the ulnar nerve was sketched on the skin for possible later electrotherapy.

—Frank R. Lichtenheld, M.D.

PERIPHERAL NERVES

Peripheral Nerve Injuries; Principles of Treatment. JOHN E. SCARFF. *Med. Clin. N. America*, 1958, May, p. 611.

THE AUTHOR reviews briefly the accepted physiologic and surgical principles of peripheral nerve surgery. The discussion is accompanied by some of the excellent diagrammatic plates on innervation of muscle which were published by the Nerve Injuries Committee, in the Medical Research Council War Memorandum No. 7. He emphasizes the "time distance" factor, which is derived from the life expectancy of the denervated muscle and the rate of neuraxonal regeneration, in determining both the urgency and success of reparative measures. Tinel's sign versus the neuroma sign is discussed, as are the nature and value of electromyography and of chronaxy tests. Various forms of injury, concussion, contusion, and axonal disruption in continuity are described and the management outlined. The general concepts of surgical treatment including end-to-end suture, transposition, and relengthening after suture are discussed. Causalgia is dealt with, and the author stresses his belief that before sympathectomy is attempted, a vigorous attempt at correcting the local nerve disease should be carried out, often with real success when the irritative lesion is corrected by direct surgery. Physiotherapy and electrical stimulation in a supportive role are put into the context of the author's experience.

—Edward B. Schlesinger, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Postmastectomy Lymphedema; A Clinical Investigation Into Its Causes and Prevention. ROY P. VILLASOR and EDWARD F. LEWISON. *Philippine J. Cancer*, 1957, 1: 317.

THIS IS a study of 50 patients who had undergone a radical mastectomy for carcinoma of the breast and subsequently developed lymphedema of the homolateral arm. Twenty-eight postmastectomy patients without arm edema were used as controls. A number of elements were studied which might influence the development of arm swelling. A review of the literature revealed an incidence of postmastectomy edema which ranged from 70 to 8 per cent. An attempt has generally been made to grade the degree of swelling, but this varies with the author. The amount of disability does not correlate with the degree of swelling. There have apparently been contradictory findings in the literature for almost every point considered.

The authors standardized their method of measurement of arm and forearm swelling. The degree of swelling was classified as slight (1 to 2 cm.), moderate (2 to 4 cm.) and marked (over 4 cm.). Most of the patients noted the onset of lymphedema while still in the hospital. No relationship was noted between the type of tumor and the swelling. Edema tended to be worse in obese patients. In this series the degree of edema was increased if radiotherapy had been administered. The type of wound closure, whether skin graft or direct edge apposition, seemed to make no difference in the presence or degree of swelling. Damage to the axillary vein and phlebitis were followed by marked swelling in this series. The findings suggest that placement of the scar on the arm or in the axilla may encourage edema. Excision of the clavicular head of the pectoralis muscle contributed in a small way to swelling.

Early mobilization of the arm tended to decrease the incidence of lymphedema. Avoidance of infection decreases the frequency of postmastectomy lymphedema. Of interest is the observation that the onset of lymphedema coincided with an injection in the homolateral arm. In view of the findings, the authors offer ten suggestions that may help to diminish the incidence and degree of postmastectomy lymphedema.

—R. L. Lawton, M.D.

Reports on Hypophysectomy in Carcinoma of the Mammary Gland with Remote Metastases (Mitteilungen ueber Hypophysektomie bei Mammakarzinom mit entfernten Metastasen). M. BERNICZEI. *Zbl. Chir.*, 83: 936.

THE AUTHOR, of the State Institute for Oncology in Budapest, Hungary, discusses the treatment of inoperable breast carcinoma and its metastases by hormone therapy, castration, adrenalectomy, and hypophysectomy. He gives a comprehensive review of the literature, but it does not include any of his cases.

The aim of all treatment is to eliminate the stimulating influence of follicle hormone. Therapy with male hormone produces improvement of only short duration (about 8 to 10 months). The antigonadotropic effect is reversible. When testosterone is discontinued an increased production of anterior pituitary hormone occurs with ensuing endocrine activity of the ovaries and adrenal glands, a kind of rebound effect.

Castration causes hypertrophy of the adrenal cortex, which, after the intervention, secretes increasing amounts of androgen and estrogen to replace the endocrine function of the gonads. Bilateral adrenalectomy to eliminate this secretion did not have the desired results.

As the gonadotropic and adrenocorticotropic hormones of the pituitary gland play the most important role in mammary carcinoma it seems logical to destroy the pituitary rather than to treat the patients with castration, adrenalectomy, and male sex hormones, thus replacing a number of major interventions by a single operation. Animal experiments with rats and mice by numerous workers proved that hypophysectomy prevented the development of mammary carcinoma.

Various methods have been used to eliminate the endocrine action of the pituitary gland: surgical extirpation, electrocauterization, x-ray irradiation, insertion of radioactive isotopes in the sella, and medication with cortisone and thyroxin.

The author collected 150 cases of hypophysectomy published in the world literature. Two of these are reported in detail. The postoperative mortality was very low. Good results as to the remission of pain, shrinking of metastases, and improvement of the appetite and general condition were achieved in about one-third to half of the cases. In a number of patients in the fourth stage of carcinoma, many of them near death, the improvement persisted for a period of one to 3 years, many being even able to return to work. The best results were obtained in women between 30 and 60 years of age; patients over 60 do not seem to be good risks for hypophysectomy.

Preoperative medication consists of 50 mgm. of cortisone and 25 mgm. of testosterone for 4 days, and 100 mgm. of cortisone one day before the operation. After the intervention, cortisone is continued in decreasing amounts. After discharge, 25 mgm. of cortisone and 100 gammas of thyroxin are given permanently.

After hypophysectomy the basal metabolism rate drops by about 20 per cent and remains at that level even under thyroxin treatment; however, no subjective symptoms of hypothyroidism were noted. The function of the adrenal cortex was tested by 17-ketosteroid excretion and the adrenalin test. Both tests showed a lowered activity of the cortex; however, no clinical symptoms of hypoadrenalism were observed.

—Werner M. Solmitz, M.D.

Late Local Recurrent Carcinoma of the Breast. KENNETH T. PAWLIAS, MALCOLM B. DOCKERTY, and F. HENRY ELLIS, JR. *Ann. Surg.*, 1958, 148: 192.

AT THE Mayo Clinic in the years 1945 through 1954, there were 202 cases of locally recurrent carcinoma of the breast. Of this group 45 patients or 22 per cent had recurrence more than 5 years after the original operation. The authors believe that the incidence of metastasis to the axillary nodes is extremely high in patients with skin recurrence and it appears that retrograde permeation and embolization are frequently responsible. The incidence of parasternal local recurrence supports the concept of retrograde embolization from parasternal lymph nodes. In the present series local recurrence most often took the form of a skin nodule located medial to the surgical scar near the sternum. This was true of tumors located in the lateral half as well as those located in the medial half of the breast. The authors do not believe that the inoculation of tumor cells at the time of operation is an important factor in their series. They believe that the time of local recurrence and the final results seem to depend less on duration of the disease, size of the lesion, and extent of local invasion by the primary lesion than on the growth potential and individual resistance factors of the patients. Survival after a clinical recurrence is usually poor and bears no relation to the length of the cancer-free period before the recurrence. —*John H. Schneewind, M.D.*

TRACHEA, LUNGS, AND PLEURA

Emergency Suture for Traumatic Rupture of the Trachea and Bronchus (La suture d'urgence des ruptures traumatiques de la trachée et des bronches). CLAUDE DUBOST. *Sem. hôp. Paris, Ann. chir.*, 1958, 12: 781.

TWO CASES of traumatic lesion of the respiratory tract are reported. The first case was that of a 34 year old man admitted to the hospital following a bus accident. He had a scalp wound in the frontoparietal region and a superficial submaxillary wound. There was peripheral facial nerve paralysis. At first he was thought to have a head injury. Later subcutaneous emphysema developed in the cervical region. A roentgenogram showed that the emphysema extended into the mediastinum. A diagnosis of rupture of the trachea was made on bronchoscopy, which was done with difficulty. The injury of the trachea was repaired under general anesthesia with a lighted bronchoscope in place to guide the dissection. A sternum-splitting incision was used. The rupture was directly inferior to the larynx and consisted of a complete transverse separation of the trachea at this point. This was repaired by suture, and a tracheotomy was done. There was an associated dislocation of the cervical vertebrae at C2 and C3 level and a fracture of the axis. These were treated by traction. The patient made a satisfactory recovery. On several occasions the suture line was examined bronchoscopically and appeared intact. Circular ruptures of this type involving the trachea are extremely rare.

The second patient was a 44 year old man in whom an open reduction of a subtrochanteric fracture was done under general anesthesia. The anesthetic was given with a closed circuit and endotracheal intubation. Pentothal, curare, oxygen, and cyclopropane were used. The anesthesia lasted 3 hours. At the end of the first hour, a small explosion took place in the circuit which dislodged the rebreathing bag from its metal support. The bag was replaced and the anesthesia was continued. At the end of the operation the patient was cyanotic. A right pneumothorax was demonstrated, and there was subcutaneous emphysema in the supraclavicular region. Bronchoscopic examination revealed a tear in the posterior wall of the trachea, and a second and longer tear in the right main bronchus.

A thoracotomy was done through the right fifth rib. The tears were identified and repaired with silk. The patient made a satisfactory recovery. At thoracotomy, areas of hemorrhagic pneumonitis were identified. These were considered to be the result of the explosion.

The author emphasizes early bronchoscopic diagnosis of these lesions and prompt repair by open operation and suture. —*Frederick W. Preston, M.D.*

Concerning the Plastic Bridging of Defects of the Thoracic Trachea (Beitrag zur plastischen Ueberbruckung der thoracelen Trachealdefekte). E. C. YASARGIL and R. HESS. *Thoraxchirurgie*, 1958, 5: 470.

THE AUTHORS first give a review of the many substances and techniques which have been used to bridge defects of the intrathoracic trachea. About every possibility that one can think of is mentioned. Their experimental contribution consists of reporting their results in 8 dogs.

They point out that eventually any suture line between a foreign substance and a hollow tube in the body such as the trachea will leak. They also show that, if the prosthetic tube is larger than the trachea and the ends of the trachea are placed inside the tube, there will be granulation tissue formed at the ends of the trachea and eventually a stricture will occur. To avoid this complication, they found it necessary to place the ends of the prosthesis inside the trachea. They found that ivalon, a prosthetic material of plastic mesh, was best. It is porous, soft, and pliable. There is less tendency for the formation of crust within the lumen of this prosthesis than of other more rigid substances, and, since it is porous, the wall of the prosthesis is kept moist and there is less tendency for mucus to become adherent to its surface.

Having placed the prosthesis without tension but with a snug fit, they then bring the omentum from the abdominal cavity up into the thoracic cavity and tack it about the wall of the trachea and the prosthesis. By the time the suture lining between the prosthesis and trachea has given way, the omentum has formed a fibrous tunnel, has grown to the wall of the trachea, and has sealed off any potential leaks.

They report that in none of their cases was there local abscess formation, empyema, or mediastinitis, because of this sealing property of the omental graft. Also they point out that with the soft ivalon and the protective covering of the omentum, there has been no erosion of the surrounding structures, such as the large vessels. Certainly the thinking behind their work seems sound, and the results are most encouraging.

—*Robert C. Combs, M.D.*

Esophagobronchial Fistulas (Ueber die oesophagobronchialen Fisteln). E. SCHWARZ and M. BERGER. *Schweiz. med. Wschr.*, 1958, 88: 688.

MOST TRACHEO-ESOPHAGEAL FISTULAS are congenital defects with partial or complete atresia of the distal esophageal segment. This defect is not compatible with life unless repaired within the first 48 hours after birth. Esophagobronchial fistulas of congenital origin may exist for long periods of time without causing difficulty. Mullard explains that there is a fold of the esophageal mucosa which obstructs the fistulous aperture. With subsequent periesophagitis and fixation of the esophagus, the fistulous communication opens, food enters the bronchial system, and symptoms ensue. Acquired fistulas may originate from inflammatory or neoplastic processes of the lungs and the esophagus. Traction diverticula of the esophagus may open into the bronchial tree.

A 33 year old male treated by the authors, was well until 3 years prior to admission when he developed a chronic productive cough culminating in a right lower lobe pneumonitis which resolved slowly on antibiotic therapy. Bronchography was compatible with bronchiectasis. On bronchoscopy, edema and swelling were noted in the middle and lower lobe bronchi, but no ulcerations, granulations, or fistulous communications were noted. The lead in the direction of the correct diagnosis was the patient's own observation that coughing spells commonly started after swallowing liquids, producing sputum discolored by the liquid swallowed. Esophagography in the right decubitus position with thin barium demonstrated a fistula. Esophagoscopic examination revealed a fistulous opening at 35 cm., with exuding mucus and air bubbles. On surgical exploration the fistulous tract entered the apical segmental bronchus of the right lower lobe. No surrounding inflammation was noted, and resection of the fistula with closure of the bronchial and esophageal extremities was accomplished. Histologically, the fistula consisted of esophageal mucosa with chronic inflammatory infiltrates and areas of necrosis. The patient was restored to normal health. The lack of inflammatory changes in the lungs and mediastinum suggested the congenital origin of this lesion. —*Karel B. Absolon, M.D.*

Treatment of Bronchial Asthma by Thoracoscopic Section of the Vegetative Nervous System (Die thorakoskopisch-vegetative Denervation als Therapie des Asthma bronchiale). E. KUX and H. KURREK. *Münch. med. Wschr.*, 1958, 100: 1049.

EXPERIMENTAL and clinical studies suggest a direct relationship of vegetative innervation of the bronchi and the genesis of bronchial asthma. The disadvantage of sympathomimetics in therapy of asthma is their systemic effect and their transient influence on the underlying disease.

Vagotomy relieves the expiratory dyspnea due to the spasm of the bronchial musculature and decreases mucous secretion. Transsection of the sympathetic fibers eliminates the cholinergic bronchoconstricting fibers and central afferent fibers which may cause reflex bronchoconstriction; an additional factor may be the release of vasoconstriction with improved blood circulation through the pulmonary parenchyma.

Eighty-six patients with bronchial asthma were treated by a thoracoscopic denervation technique as previously described (*Münch. med. Wschr.*, 1955, 4: 431). Vagotomy is possible only on the right side at the T2 to T5 level. On the left, due to the low anatomical course of the recurrent laryngeal nerve. vagotomy is technically difficult. On the left, therefore, with 2 per cent novocain infiltration of the vagus and phrenic nerves, the denervation accomplished was only temporary. The sympathetic chain was transsected bilaterally between T1 and T7 in several places.

The age of the patients was between 17 and 75 years and all of them proved to be resistant to medical therapy. Several patients in a severe status asthmaticus had first a vagotomy on the right side in deep anesthesia, followed by transsection of the sympathetic chain at a second stage. In 5 patients treated, a concomitant duodenal ulcer was identified and in 4 a postgastrectomy jejunal ulceration was diagnosed. The etiologic relationship of both diseases and the therapeutic results in both conditions by such means are stressed.

Forty-one patients were treated by vagotomy on the right side and bilateral sympathectomy and 34 by vagotomy and sympathectomy on the right side only. Twenty patients in the first group and 19 in the second were relieved of all their symptoms; 19 in the first and 9 in the second group were markedly benefited and without asthmatic attacks. As some patients in this group had asthma of long duration with resulting emphysematous changes and failure of the right side of the heart, which was only partially reversible, it may be understood why one patient in the first and 3 in the second group were unchanged or only slightly benefited. One patient subjected to vagotomy on the right side and sympathectomy on the left was asymptomatic postoperatively. Bilateral sympathectomy benefited 4 of 5 patients and left one entirely asymptomatic. Sympathectomy on the left side improved 4 of 4 patients, but one patient with transsection of the sympathetic nerve on the right side only was not benefited. —*Karel B. Absolon, M.D.*

Hypertrophic Pulmonary Osteoarthropathy, Bamberger-Marie, as an Early Symptom of Bronchial Carcinoma (Zur Osteoarthropathie hypertrophiante pneumique, Bamberger-Marie, als Fruehsymptom des Bronchialcarcinoms). D. GEHRIG und W. KAULBACH. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1958, 288: 344.

THE AUTHORS state that in the last year, they observed 7 patients with the Bamberger-Marie syndrome. Four of these had the complete classical syndrome and in the 3 others it was incomplete.

The points of interest in this article are that in 5 of the 7 cases, the carcinoma was a medullary carcinoma with little or no squamous cell formation. Only one of the 7 cases was recognized as being a bronchiogenic carcinoma. The 6 others were followed up for from 3 to 10 months before the true condition was discovered.

The authors recognize that by the time the Bamberger-Marie syndrome has developed clinically, the carcinoma is probably inoperable, but they believe that the clinician should keep this significance in mind in every case of rheumatoid polyarthritis. They

include one graph showing the tremendous increase in the absolute incidence of bronchiogenic carcinoma that has been observed at the Surgical Clinic of the University of Heidelberg.

—*Robert C. Combs, M.D.*

Limited Thoracotomy and Enzymatic Therapy in the Treatment of Early Clotted Hemothorax. SANFORD W. FRENCH, III and GEORGE F. RUMER. *U. S. Armed Forces M. J.*, 1958, 9: 949.

THE AUTHORS feel that within 10 days after the onset of hemothorax it becomes apparent whether or not all blood can be evacuated from the pleural cavity by needle aspiration. Once it has been determined that further aspiration of the chest is futile and if any significant degree of hemothorax remains, the authors have adopted the following plan of therapy. A "limited" thoracotomy with resection of about 4 to 5 inches of the sixth or seventh rib laterally is done with the patient in the standard thoracotomy position. The pleural cavity is opened and all soft clots are removed. Pockets of encapsulated blood are broken up and fluid is removed by suction. A large right angled No. 45 F. intercostal catheter is then inserted in the lowermost portion of the chest and connected to a waterseal.

Immediately following the operation two ampules of varidase (streptokinase and streptodornase, totaling 200,000 units of streptokinase and 50,000 units of streptodornase) are mixed in 20 ml. of physiologic saline solution and inserted into the pleural cavity through the chest tube, which is then clamped. The tube is kept clamped for 12 hours unless the patient's temperature rises to 104 degrees F., at which time the tube is opened immediately. This procedure can be repeated daily if indicated by lack of clearing on the daily chest roentgenogram. Usually only two injections of enzymes are required. Two illustrative cases are reported.

The authors feel that the limited thoracotomy has the advantage of less operative trauma, less reluctance on the part of the surgeon to operate in a borderline case, and fewer postoperative complications. The regimen outlined is not advocated for cases of hemothorax, organized fibrothorax, or empyema. The authors think that early "limited" thoracotomy and decortication plus enzyme therapy has achieved excellent results in a small series of patients, within a shorter period of hospitalization, and with a much lower morbidity rate.

—*John H. Schneewind, M.D.*

Evaluation of 100 Cases of Lobectomy (Considerazioni su una serie di 100 lobectomie). G. FOJANINI and G. ILLING. *Arch. ital. chir.*, 1958, 83: 345.

THE AUTHORS have studied 100 patients who had lobectomy for various conditions, and evaluated the preoperative care, surgical technique, and postoperative treatment to which they ascribe the good results. In this series of 100 patients operated on in the past 2 years there were: 28 with abscess of the lung, 26 with bronchiectasis, 19 with benign and malignant neoplasms, 13 with echinococcus cyst, 7 with embryonal tumors, and 7 with tuberculosis. There were no mortalities. Complications were seen in only 18 patients and bronchopleural fistula developed in only 6 of them.

The authors attribute the good results to adequate preoperative evaluation of the respiratory function. Antibiotics were used preoperatively by means of the inhalation technique. The anesthesia was kept very superficial and the patient was kept well oxygenated. Muscle relaxation was accomplished by adequate curarization. During the operation the involved bronchus was closed early in the procedure. The surgical technique utilized was that described by Paolucci.

During the postoperative period, all efforts were directed at closing the pleural space. This was done by using two tubes in the pleural cavity for positive pressure drainage. Bronchial aspiration of secretions was done frequently and if necessary through a bronchoscope. There was a regular exercise for respiration that was executed postoperatively; this was an important factor in keeping the lung aerated and expanded.

The authors have not encountered any difficulty with hyperdistention of the residual lung parenchyma during the postoperative period. A thoracoplasty should be done only if a positive and negative pressure respiratory machine is available. The authors make use of pneumoperitoneum to reduce the pleural space on the resected side.

—*Roland A. Manfredi, M.D.*

The Bronchus Stump. R. B. LYNN. *J. Thorac. Surg.*, 1958, 36: 70.

IN CHEST SURGERY, regardless of how the bronchus was closed, it practically always reopened in the postoperative period with the development of an empyema and a bronchopleural fistula. Thus, as late as 1935, the mortality rate of 64 per cent in lobectomy for bronchiectasis was considered encouraging. Even today the most common cause of failure in the surgery of lung resection is bronchopleural fistula.

The most common cause of failure to heal is infection of the sutured bronchus stump. Infection may be caused by spillage of secretions during resection, rupture of abscesses, and infected hilar lymph nodes. It may also result from transgression of infected tissue planes and delayed elimination of the pleural dead space. Another cause is the tuberculous involvement of the mucosa and submucosa at the line of section. Poor surgical technique is another factor causing infection.

Two other causes of stump breakdown are devitalization and failure to cover the bronchial suture line with living intrathoracic tissue.

With the knowledge of these causes, the following preventive measures are suggested:

1. No patient should be operated upon until the infection from which he is suffering is adequately controlled.

2. When lung-overlying cavities, abscesses, or caseous lesions are being mobilized, it must be done extrapleurally.

3. Transgression of infected tissue planes must be avoided by substituting a lobectomy for a segmental resection.

4. Rapid elimination of pleural dead space should be done to prevent postoperative empyema and fistula. Adequate tube drainage of the pleural space will encourage expansion of the lung. If necessary, phrenic crush, pneumoperitoneum, or thoracoplasty must be done.

5. The bronchus should be divided as high as possible.

6. Overzealous peribronchial gland dissection should be avoided.

7. The suture line should always be covered, preferably by living intrathoracic tissue, such as a pedicled pleural flap, pericardial flaps, or even pedicled intercostal muscle bundles.

8. Attention should be paid to the amount and careful placement of suture material.

The technique of closure itself is most important and may be summarized in the following words—gentleness, brevity, simplicity, and coverage. It is described in detail. Wire was the preferable suture material for closing the stump.

With this technique, more than 200 consecutive resections have been performed by the author with only 2 bronchopleural fistulas. These developed among 150 resections for pulmonary tuberculosis.

—Alfred H. Noehren, M.D.

The Surgical Treatment of Chronic Pleural Empyema. DAVID V. PECORA. *J. Thorac. Surg.*, 1958, 36: 92.

FORTY-FIVE PATIENTS WITH chronic empyema were subjected to 56 definite surgical procedures at the Raybrook State Tuberculous Hospital between January 1, 1950 and October 1, 1957. Thirty-nine of the patients had pulmonary or pleural tuberculosis at one time or another. The remaining 6 had, in addition to empyema, (1) cystic disease of the lung, (2) pyogenic pneumonia, and (3) pulmonary disease of undetermined etiology. The empyemas followed thoracotomy in 29 instances, and pneumothorax in 9 cases; in 10 cases they were primary. In late years, the number of tuberculous and mixed pyogenic infections had decreased to 16 and 7, respectively, and the number of pyogenic infections and sterile pleural spaces had increased to 13 and 9, respectively.

A bronchopleural fistula was present at one time or another in 34 of the 45 patients. Such a fistula seemed to have no effect upon the results of treatment, provided the pleural space was obliterated and adequate amounts of tissue were available to cover the fistula.

Secondary pyogenic infections apparently are frequently iatrogenic. Tuberculous empyemas can often be rendered sterile by drug therapy alone. Isoniazid was almost always one of the drugs employed, in combination with others.

Two patients had serious complications consisting of massive intrapleural hemorrhage and spontaneous pneumothorax. They both had progressive pulmonary tuberculosis and mixed tuberculous and pyogenic empyema, from which one died. Another patient died of cor pulmonale before her mixed empyema could be cured.

Surgery was performed in 56 instances. It consisted of 9 thoracoplasties, 15 modified Schede operations, 9 decortications, 4 decortications and thoracoplasties, and 6 plastic procedures.

To be successful, definitive surgery should obliterate the pleural space. The wound may be sutured almost completely at the time of surgery and adequate drainage maintained with a soft rubber tube.

Decortication has proved most successful in expanding lungs which contain little disease and when the empyemas have been of relatively short duration. A poorly expansile lung may be useful as a space filler. Parietal pleura may be allowed to remain, if one wishes to minimize blood loss. The Bovie coagulation unit is an excellent hemostatic agent.

In this group of patients, decortication alone was accompanied by a permanent increase of vital capacity in all but one instance. Thoracoplasty performed to obliterate a rigid pleural space seems to have little effect on vital capacity. Emphysema following decortication was a rare complication.

In many instances a carefully performed thoracoplasty will accomplish the same results as decortication and may influence the surgeon to prefer thoracoplasty to decortication in poor risk patients.

Drug therapy is undoubtedly responsible for the excellent results of surgery for chronic tuberculous empyema. But the treatment of chronic pyogenic empyema is dependent more upon surgery than antibacterial agents and surgery alone can effect a cure in almost every instance.

—Alfred H. Noehren, M.D.

HEART AND PERICARDIUM

The Prognosis in Simultaneous Injury to the Ventricular Wall and the Coronary Artery (Zur Prognose der gleichzeitigen Herzkammer- und Kranzadergverletzung). E. HOLDER and W. KAULBACH. *Chirurg*, 1958, 29: 259.

FACTORS which influence the prognosis in wounds of the heart include the location and extent of the injury, and the rapidity with which cardiac tamponade develops. Early recognition of cardiac tamponade is essential. The pathophysiology of cardiac tamponade is the compression of the venae cava and atria, with diminution of diastolic filling and, finally, cardiac arrest. Clinically, venous pressure rises, and both arterial pressure and pulse amplitude decrease. Cyanosis may give way to pallor. There is apprehension, then dullness of the sensorium, followed by coma. When the pericardial pressure exceeds pressure within the inflow tracts, there is failure of the coronary circulation leading to myocardial failure, and death may occur within minutes.

Most penetrating wounds of the heart still end in death, as the result of rapid hemopericardium formation, failure to recognize cardiac tamponade, or inability to transport the patient rapidly to an operating room. The authors are opposed to needle aspiration of the pericardium in these cases. This procedure tends to delay definitive surgical care of the wound in the myocardium.

The major part of this article is a detailed report concerning a 19 year old male who received a stab wound in the fifth left intercostal space. Forty minutes later, on arrival at the clinic, he still reacted, but was

very apprehensive, with a pulse rate of 120 beats per minute. The cardiac silhouette on the chest roentgenogram was enlarged. The pulse and blood pressure rapidly ceased, and coma ensued. Thoracotomy 2 hours after injury disclosed a pericardium tensely filled with clotted blood and complete tamponade. Normal cardiac rhythm spontaneously followed evacuation of the hemopericardium. A wound 4 to 5 cm. above the apex of the heart had severed the anterior descending branch of the left coronary artery. Repair of the ventricular defect necessitated sacrifice of the injured coronary artery, despite the knowledge that a massive anterior apical myocardial infarct would result. Even with the infarct, the postoperative course was excellent.

An electrocardiogram taken immediately after the operation showed a sinus tachycardia and elevation of the ST segment in lead I. Two days later, the electrocardiogram indicated the first stages of an acute anterior apical myocardial infarct. Serial electrocardiographic changes to the end of the first postoperative year are reported. By that time the patient was completely free of symptoms and, against the advice of his physicians, had participated in three football matches.

Open surgical intervention is indicated in every case in which cardiac tamponade results from a wound. The *first* physician who sees such a patient must arrange to have surgical facilities made available as rapidly as possible. —*Elmer V. Dahl, M.D.*

Rupture of Aneurysms of the Sinus of Valsalva into Cardiac Chambers (Rupture des anévrysmes des sinus de Valsalva dans les cavités cardiaques). CH. DUBOST, PH. BLONDEAU, and A. PIWNICA. *J. Chir*, Par., 1958, 75: 539.

ANEURYSM OF THE SINUS OF VALSALVA is a rare lesion, which occurs more frequently in males (82 per cent) and usually escapes clinical detection until it ruptures. In the acquired type, which is a localized manifestation of a process (mycotic or luetic) involving the whole ascending arch, rupture is rare.

The congenital type almost always involves the right coronary or the noncoronary sinus. The aneurysm expands laterally or inferiorly as a fusiform, surprisingly long outpouching with a small orifice. This outpouching remains enclosed within the base of the heart so that no abnormality is detectable on the outside of the ascending aorta. Rupture occurs at the tip of this outpouching. Aneurysms of the noncoronary sinus always rupture into the right atrium, while those of the right coronary sinus have a more variable course (right or left ventricle, pulmonary artery, or pericardium.)

Typically, rupture gives rise to sudden, severe retrosternal pain, occasionally radiating into the abdomen, but without the typical "coronary" pain radiation. This intense pain, often associated with rupture, may last a few hours. Following an asymptomatic latency period, symptoms of myocardial insufficiency appear and progress rapidly. Differential diagnosis must be made from rupture of the interventricular septum or rupture of an aortic aneurysm into the pulmonary artery. In the absence of a typical history, the diagnosis becomes more difficult and a congenital lesion is often suspected, such as patent ductus or interventricular septal defect with aortic insufficiency. The clinical course following rupture varies greatly; the average period of survival is about one year.

The authors have collected 14 cases from the world literature in which attempts were made to repair ruptured sinuses of the Valsalva aneurysm. They describe in detail a case of their own in which the repair was achieved by means of an extracorporeal circulation. —*Jonas Brachfeld, M.D.*

The Correction of Mitral Insufficiency with a Transvalvular Polyvinyl Formalinized Plastic, Ivalon, Sponge Prosthesis. WILLIAM RAY RUMEL and PRESTON R. CUTLER. *Dis. Chest*, 1958, 33: 401.

THE AUTHORS acknowledge the vast amount of work that has been done on the physiology of mitral insufficiency and also the numerous attempts to correct this condition surgically. They believe, however, that since the problem is far from being solved, further attempts to control mitral regurgitation would seem reasonable. Most autogenous or heterologous tissues or foreign bodies implanted within the heart have in the past caused either hemolytic, hemorrhagic, or embolic complications. The authors have been consistently impressed, on the other hand, with the tolerance of the experimental animal to the intracardiac placement of ivalon sponge prostheses, which do not seem to be complicated by the above phenomena. They used a wedge-shaped prosthesis that was formed and shaped at the time of operation and which contained three tails. Through the left atrial approach they were able to place the wedge-shaped sponge into the most insufficient portion of the mitral valve and affix two of its tails transmurally to the atrium, and the remaining tail transmurally to the ventricle below. By varying the placement of the prosthesis or altering the points of fixation in the atrial or ventricular wall, they could dynamically correct initial insufficiency without creating further stenosis.

In animal experiments and in 5 clinical cases the ivalon has been extremely well tolerated with minimal evidence of thromboembolic phenomena, hemolysis, or hemorrhagic complications, which is not true of other materials formerly used. Illustrations and diagrams of the prosthesis and means of its placement are given. The authors warn against the widespread use of the method until more detailed clinical and laboratory study has established its place in the therapeutic armamentarium of mitral insufficiency. —*Kenneth Hardy, M.D.*

ESOPHAGUS AND MEDIASTINUM

Esophageal Atresia; Experience in 17 Cases, with Notes on Operative Technique. CHRISTOPHER PARISH and C. F. A. CUMMINS. *Brit. M. J.*, 1958, 1: 1140.

THE AUTHORS discuss their experience with the diagnosis and treatment of 17 cases of esophageal atresia. Nine of their patients are alive and well. One case was diagnosed at necropsy; hence, no operation was performed. A second patient was felt unfit for operation

and died on the third day after birth. Pneumothorax, complications from gross cardiac defects, and empyema with a necrosed esophageal wall were encountered.

The diagnosis of esophageal atresia is fairly constant, and in brief the condition should be suspected in any newborn child that shows difficulty with respiration, excess mucus secretion, choking or intermittent cyanotic attacks, or who had a prenatal history associated with hydramnios. These symptoms are often precipitated or accentuated when feeding is attempted.

The authors believe that it would be of value to divide the cases into two main groups—those in which a primary anastomosis can be performed (group 1) and those in which anastomosis is impossible (group 2a) or unnecessary (group 2b), ligation of the fistula being all that is required. The earlier the diagnosis is made, the greater the chance that surgery will be successful. In their series of 17 cases, only one patient was operated on after 72 hours and he survived. Paradoxically, they found that the average time between birth and operation in the survivors was 47 hours, while in the nonsurvivors it was 39 hours. The earliest diagnosis in their series was 1.5 hours after birth, and was made by a midwife who was endeavoring to administer intragastric oxygen.

The procedure is carried out through an oblique incision into the right chest. The extrapleural approach was tried in 2 cases but the authors believe that the transpleural approach is best, after considering everything. The authors use four basic everting mattress sutures which are named north, east, south, and west by the surgeon as he puts them in and hands the ends, which are clamped with a distinctive pattern of forceps, to the assistant. Usually, one single suture is then placed between each mattress suture, making a total of eight sutures around the periphery, and the parietal pleura is approximated over the anastomosis. At this stage the anesthetist withdraws the rubber catheter over which the anastomosis has been performed and replaces it by a length of fine polythene tubing which is passed across the anastomosis under direct palpation and vision.

Apart from those cases in which primary anastomosis cannot be performed, the authors believe that the use of gastrostomy must obviously be assessed on its merits in each case. Although some people advise its routine use either at the time of, or shortly after, every primary anastomosis, the authors believe that the polythene tube inserted as described at the conclusion of the anastomosis is quite adequate for nutritional requirements. The postoperative care and feeding of the patient are discussed.

In conclusion, the authors believe that it is generally agreed that, other things being equal, the higher the birth weight, the lower the mortality, and this is certainly borne out in this series. Also, from the medical and nursing points of view, past experience is invaluable in reducing the mortality and morbidity rates. Therefore, cases should be sent to an experienced team if at all possible, and the extra journey with the baby is far outweighed by the advantages of getting the case to such a unit.

—Frank W. Pirruccello, M.D.

Diverticula Associated with Megaesophagus (Les diverticules associés au mega-oesophage). P. SANTY, P. MICHAUD, and H. VIARD. *Ann. chir.*, Par., 1958, 12: 512.

AFTER a review of the cases of 200 patients with megaesophagus and more than 100 patients with diverticula of the esophagus treated by the authors, a combination of the two conditions was demonstrated in 6 patients. The authors present in detail the case histories, symptomatology, and treatment of these patients together with the roentgenograms.

The ages of the 6 patients varied between 40 and 60 years. Three of them were males and 3 females. One diverticulum was located in the mid-third of the esophagus, and the 5 others in the lower third near the esophagogastric junction. In no patient with megaesophagus and diverticulum was the latter encountered in the pharynx or upper third of the esophagus, nor have any such cases been reported elsewhere in the literature.

All of the diverticula were located on the right side, and all those in the lower third were found to be in contact with the diaphragm when they were filled with barium. Of the 5 in this region, 4 were about the size of a walnut and one was more than 5 cm. in diameter.

The presenting symptoms in all 6 patients were typically those of cardiospasm. All the patients gave a lengthy history and showed the characteristic tendencies of nervousness, anxiety, and worry.

One patient was treated conservatively with good results. One refused therapy, and 4 submitted to surgery. These patients had Heller procedures via the abdominal route. Two of them had excellent results and are symptom free. The other 2 had to have second operations because of the recurrence of symptoms. In one of these patients the abdominal route was utilized again, while in the other the transthoracic approach was selected. In both these cases diverticulectomy was also performed during the second intervention.

The authors emphasize that more often than not the diverticulum is not diagnosed, since it is obscured by the esophageal dilatation, and because the patient's primary complaint is one of cardiospasm. The diverticulum is usually only clearly demonstrated on the roentgenogram after the Heller procedure, when the size of the esophagus is reduced. It is suggested that the thoracic approach is preferable when diverticulectomy is anticipated with the Heller operation. *—Peter Beaconsfield, M.D.*

Diverticula in the Lower Third of the Esophagus (Les diverticules épiphréniques de l'oesophage). P. SANTY, P. MICHAUD, H. VIARD, and G. R. BETTOLO. *Ann. chir.*, Paris, 1958, 12: 504.

THE AUTHORS review 22 consecutive cases of diverticula in the lower third of the esophagus. The patient's ages ranged between 37 and 75, with an average age of 55 years. The sexes were equally involved. Of all diverticula of the esophagus, those located in the lower third are by far the largest in size. Roentgenographic examination revealed them to be as big as tangerines, and in some instances approximating the dimensions of an orange.

The symptomatology included retrosternal pain, dysphagia, regurgitation, and also those symptoms encountered in reflux esophagitis. Roentgenologic examination often gave a picture of a megaesophagus with the presence of a diverticulum. In two instances the anterior position of the diverticulum simulated the appearance of a hiatus hernia.

On esophagoscopy, malignant tumors involving the diverticulum were found in 3 patients. Benign strictures were encountered in 2 patients; 5 had a megaesophagus; 2 were found to have associated hiatus hernia; and 2 patients had additional diverticula higher up in the esophagus. Varying degrees of cardiospasm were encountered in about half of the patients reviewed.

Medical treatment is reserved for those patients with minimal symptoms and without complications. It consists of the administration of antispasmodics, dietary restrictions, and lavage of the diverticulum. This approach, if carefully followed, may well obviate the necessity for surgery.

For patients who have a large diverticulum with considerable discomfort surgery is indicated.

Of the 22 patients studied in this article, 8 were treated medically; one had a Heller procedure; 3 underwent diverticulectomy; one had a resection of the lower third of the esophagus; one patient had a gastrectomy; and one had no treatment because of the presence of an advanced carcinoma of the esophagus.

There was no operative mortality. All immediate postoperative results were excellent and except for 3 patients with carcinoma, all are symptom free. Of the 3 patients with carcinoma, 2 had resections. One survived only a few months, and one for 2 years following the operation. —*Peter Beaconsfield, M.D.*

Parabronchial Diverticula of the Esophagus (Les diverticules parabronchiques de l'oesophage). P. Santy, P. Michaud, M. Jaubert de Beaujeu, H. Viard, and G. R. Bettolo. *Ann. chir.*, Par., 1958, 12: 493.

Diverticula of the pharynx and esophagus can be subdivided, according to anatomical location, into three major groups: those found in the pharynx or upper third of the esophagus, those in the middle third (parabronchial), and those found in the lower third (periphrenic).

The authors treated 107 patients, 60 of whom had diverticula which could be classified in the first group, 25 whose diverticula fell into the second group, and 22 with diverticula of the lower third of the esophagus.

From the analysis of the cases it appears that while all diverticula may cause symptoms and discomfort, those located in the middle third of the esophagus particularly can produce complications of a serious nature. Twelve of the 25 patients with midthoracic diverticula already had esophagobronchial fistulas when first seen by a physician. It is with diverticula located in the middle third of the esophagus that the authors are primarily concerned in this article.

Roentgenographic examination revealed that in 15 of the 25 patients the diverticulum protruded to the right side, in 3 to the left, and in 5 patients anteriorly. The ages of the patients varied between 17 and 75 years, with an average age of 50. The sexes were evenly represented.

The presenting symptomatology usually fell into one of three categories: dysphagia with regurgitation and increased salivation, retrosternal pain, dyspepsia, and postprandial discomfort, or pulmonary complaints. In this latter regard the conditions of 3 of the patients with esophagobronchial fistula were originally misdiagnosed as carcinoma of the lung.

According to the findings of the authors inflammation, ulceration, and rupture of the diverticulum in the midthird of the esophagus seem to be more common than is generally believed. Rupture into the bronchial system was common because of the anatomical proximity of these structures. A final diagnosis in all patients was made by radiologic examination and esophagoscopy.

The method of treatment varied according to the symptoms presented. Of the 25 cases reported here, 9 did not warrant any treatment. One patient had a resection of the diverticulum through a right thoracotomy. Two patients, whose primary difficulty was dysphagia with a megaesophagus, underwent Heller procedures with excellent functional results and a diminution in the size of the diverticulum. Neoplastic changes were found in the apex of one diverticulum on esophagoscopy. A positive biopsy was obtained. The patient received roentgen therapy, and is alive 8 months subsequent to this treatment.

Of the 12 patients undergoing surgery for esophagobronchial fistulas, 8 had excellent postoperative results after surgical closure of the fistula. They are all still living and well. Four patients died postoperatively; 2 of them succumbed to cardiac complications, 1 died of a complicating empyema, and 1 from progressive pulmonary insufficiency following a lung infection. —*Peter Beaconsfield, M.D.*

Contribution to the Clinical Picture and Therapy of Tuberculosis of the Esophagus (Ein Beitrag zur Klinik und Behandlung der Oesophagustuberkulose). W. Widow. *Zbl. Chir.*, 1958, 83: 1093.

Tuberculosis of the esophagus is relatively rare and apparently always of secondary origin. So called implantation tuberculosis may follow a trauma of the mucosa, such as may be caused by injection of a caustic material, or a mucosal lesion, for instance, carcinoma or a diverticulum. However, the most frequent mode of infection is by contiguity from tuberculous lymph nodes, vertebrae, or pleura. Lymphogenous or hematogenous spread may occur.

Miliary dissemination or ulcer formation are the most frequent types. Among the complications, perforation and the formation of esophagotracheobronchial fistula may be mentioned.

The lesion may remain asymptomatic or cause dysphagia, retrosternal pain, vomiting, and inanition.

Roentgenographic findings are not characteristic as they may suggest an ulcer, tumor, or stenosis. A definite diagnosis can be established only by esophagoscopy and biopsy which, however, may give negative results in paraesophageal tuberculosis because in such cases normal or edematous mucosa overlies the specific lesion. Furthermore, development of miliary tuberculosis has been ascribed to biopsies.

The following findings are suggestive of tuberculosis of the esophagus: changing intensity of the symptoms without actual progress of the condition, existence of the specific process in other locations, and roentgenograms which are not characteristic and show stenosis with a normal mucosal pattern.

Spontaneous cures or those after the administration of streptomycin have been reported. If conservative treatment fails, an operative intervention in the form of resection of the involved segment is definitely indicated.

A man, aged 65 years, was admitted with complaints of dysphagia, vomiting, and loss of weight. The symptoms had appeared 6 months prior to admission and had nearly subsided shortly before the entry into the hospital. Repeated x-ray studies demonstrated a moderate stenosis in the lower portion of the esophagus, with a niche in the anterior wall, and a well preserved mucosal pattern. The esophagoscope could be advanced only 39 cm. The biopsy gave negative results. A tentative diagnosis of malignant tumor was made and, inasmuch as at the time of the operation the cicatricial lesion suggested carcinoma, the involved segment was resected and esophagogastrostomy was performed. The histologic examination established the diagnosis of tuberculosis. The patient made an uneventful recovery.

—Joseph K. Narat, M.D.

MISCELLANEOUS

A Case of Bilateral Retrocostosternal Diaphragmatic Hernia (Su un caso di ernia diaframmatica retrocosto-sternale (del Morgagni) bilaterale). D. Spada. *Acta chir. ital.*, 1958, 14: 247.

The author presents a case of bilateral retrocostosternal diaphragmatic hernia discovered in a 63 year old patient who was examined because of progressive dyspnea of 2 years' duration and some epigastric distress which had been present for many years. Physical examination was negative. Hypochromic anemia and occult blood in the stools were found. Thoracic roentgenographic examination revealed a right paracardiac mass with fluid level. Radiologic examination of the gastrointestinal tract revealed the abnormal intrathoracic location of the stomach and transverse colon on the left and on the right. Surgical treatment was carried out through a midline laparotomy with complete reduction of the hernial contents. The right sac was reduced but the left sac was not because of the adhesions to the pleura and pericardium. The diaphragmatic defects were closed.

The author comments on the etiopathology of these hernias, stressing diaphragmatic congenital malformations and the imbalance of abdominothoracic pressures as necessary elements for their development. The diverse anatomic and symptomatologic possibilities are reviewed and the importance of the radiologic examination in solving this difficult diagnostic problem is emphasized. Finally, even if most of the cases reported in the literature have been treated through an abdominal incision, the author thinks that the transthoracic approach should be better to control the surgical contingencies.

—Ruben Brochner, M.D.

Myasthenia Associated with Thymic Tumors (A propos des myasthénies associées à des tumeurs thymiques). F. d'Allaines and G. de Saint-Florent. *J. chir.*, Par., 1958, 76: 40.

The authors present a review of the literature pertaining to myasthenia associated with thymic tumors.

In 15 per cent of the cases of myasthenia, thymic tumors are found, but, conversely, 75 per cent of the patients with thymic tumors develop myasthenia. According to one author, malignant thymomas are not apt to give rise to myasthenia.

Resection of a tumor of, or near, the thymus is always indicated. Thymectomy in the absence of a demonstrable tumor carries a relatively high mortality and gives a low rate of cure; therefore, it is indicated only when medical treatment fails and radiation brings about a remission. Radiation does not produce lasting cures.

Prostigmine is the drug of choice for medical treatment and for the preoperative and postoperative therapy. In a crisis, tensilon has proved to be a potent, safe, and quick-acting cholinergic drug.

—Leonid S. Cherney, M.D.

The Present Status of Surgery of the Thymus (Zum heutigen Stand der Chirurgie des Thymus). R. Wanke and P. Alnor. *Thoraxchirurgie*, 1958, 5: 550.

The authors, of the Surgical Department of the University of Kiel, Germany, discuss the physiologic role of the thymus, especially its relations to other endocrine glands, and the indications for thymectomy.

Although the physiologic role of the thymus is still uncertain animal experiments have proved that in the prepuberal period the thymus has a definite endocrine function. In guinea pigs thymectomy caused, first, stimulation and, later, degeneration of the thyroid, as well as premature maturation of the gonads, followed by early involution. Castration before puberty causes hyperplasia of the thymus.

Other investigations showed that the thymus secretes a hormone before puberty which, in small quantities, can also be demonstrated in the urine. This substance neutralizes the influence of thyroxin on the level of cholesterin in the blood and increases the excretion of creatinine. Children excrete from 1,000 to 1,200 units daily of this substance in the urine, as compared with 170 to 200 units secreted by adults. Furthermore, there seems to be a relationship between the thymus and the adrenal cortex. In persisting thymus some degree of atrophy of the adrenal cortex is observed, and in Cushing's disease hyperplasia of the thymus occurs.

Whether there is a relationship between the thymus and myasthenia gravis is still an open question. In 15 per cent of the patients with myasthenia a thymoma was found; on the other hand, 25 per cent of the patients with proved thymoma did not suffer from myasthenia gravis at the same time.

Thymectomy is done for two conditions: tumors and myasthenia gravis. Although a large proportion of thymomas are benign, extirpation of the gland is indicated in all cases because malignant degeneration of originally benign tumors occurs frequently.

In myasthenia gravis thymectomy has been performed in a number of cases in addition to prostigmine

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medication. The authors compiled from the literature a series of 288 thymectomies for myasthenia. After exclusion of the malignant conditions and postoperative deaths the following results were obtained in a group of 109 cases: complete cure in 32.5 per cent, marked improvement in 31.19 per cent, slight improvement in 25.8 per cent, and no success in 8.3 per cent. Other workers had less encouraging results. A statistic published by the Mayo Clinic indicates that the results are not better with thymectomy than with prostigmine alone. —*Werner M. Solmitz, M.D.*

Proximal Interruption of a Pulmonary Arch (Absence of One Pulmonary Artery); Case Report and a New Embryologic Interpretation. RAY C. ANDERSON, FLORENCE CHAR, and PAUL ADAMS, JR. *Dis. Chest*, 1958, 34: 73.

CONGENITAL absence of a pulmonary artery has been reported about 50 times. The authors report the case of a 13 month old infant who died after angiocardiograms had indicated absence of the right pulmonary artery. At autopsy, the heart was found to be markedly enlarged, particularly the right ventricle. All the cardiac valves were normal in appearance. The foramen ovale was not patent; the interventricular septum was intact. Arising from the trunk was a single left pulmonary artery which was enlarged. The ductus arteriosus was closed. The coronary arteries and the pulmonary veins were normal. An unnamed vessel with an obliterated lumen rose from the innominate artery and reached the hilum of the right lung where it joined with a patent vessel that branched to supply the lobes of the lung. The surface of the lung seemed to be supplied by an unidentified branch of the subclavian artery. The right lung was smaller than the left and its vessels were thick walled with a dense adventitia. The vessels of the left lung were normal except for medial hypertrophy in the smaller arteries.

Absence of the right pulmonary artery may be found without other anomalies or may be associated with a patent ductus or coarctation of the aorta. Absence of the left pulmonary artery is frequently associated with an intracardiac defect or the tetralogy of Fallot. The pulmonary arteries are developed asymmetrically from a pulmonary arch system which in turn is dependent on the development of the fourth aortic arch. Absence of a pulmonary artery indicates a break in continuity of arteriogenesis indicative of proximal interruption in the arch. Function of the ductus arteriosus during fetal life permits normal development of the lung for that period.

Congenital absence of a pulmonary artery without other disease may be asymptomatic, may cause chronic pneumonitis, or decrease exercise tolerance. The diagnosis can be made by the ordinary chest roentgenogram. —*B. G. P. Shafiroff, M.D.*

Treatment of Pulmonary Insufficiency by Tracheal Fenestration. EDGAR MAYER, CHARLES F. BLAZSIK, and ISRAEL RAPPAPORT. *J. Am. M. Ass.*, 1958, 167: 696.

THE USE of tracheal fenestration is advocated in the treatment of pulmonary insufficiency. Establishing a permanent tracheal airway allows the easy removal of obstructing secretions and provides adequate ventilation. In some instances the tracheal fenestration obviates the need for mechanical ventilation and prevents hypoventilation crises. It is believed that the creation of a permanent tracheal opening in an early phase of pulmonary emphysema may allow definite prolongation of the patient's life despite low pulmonary reserves. The experience of the authors is significant in this regard. They noted in severely involved patients that as the pulmonary capacity progressively diminished the patients became increasingly sensitive to the least interference with ventilation and less tolerant of secretions accumulating in the airways. The ability to keep the airways clear to the tracheal opening prevented secondary infection, forestalled greater loss of pulmonary capacity, and prevented progression of the emphysema as well as of the bronchiolitis.

Four case histories are presented and the course of each of these patients seems to indicate that as long as the airways remain patent and ventilated, the functioning lung structures are more able to operate to the limit of their compensatory capacity. It should also be mentioned that inhalation therapy is greatly enhanced by the presence of a permanent tracheal opening.

—*Orville F. Grimes, M.D.*

Clinical Observation and Histological Studies in Esophageal Stenosis Due to Caustic Agents (Rilievi clinici e reperti anatomo-istologici sulle stenosi cicatriziali da caustici dell'esofago). S. SUNSERI and A. CANCRINI. *Ann. ital. chir.*, 1958, 34: 636.

THE AUTHORS report on 48 patients with stenosis of the esophagus due to caustic agents. The method of management is a difficult one. They believe that antibiotics favor cicatricial fibrosis, and that the use of instrumental dilators favors an increase in hypertrophy of the muscularis near the stenosis. They found that the ultimate curative treatment in strictures of 1 to 8 years of duration was resection of the stricture with esophagogastrostomy or esophagojejunostomy.

—*Alexander J. Conte, M.D.*

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Concerning So-Called Spontaneous Rupture of Hernias (Ueber sogenannte Spontanrupturen von Hernien). H. HELMIG. *Schweiz. med. Wschr.*, 1958, 88: 662.

SPONTANEOUS RUPTURE, with prolapse of the intestines or of the omentum, is an infrequent complication of hernias. The author summarizes 46 such cases from the literature, and reports an additional case.

A 69 year old woman had, 29 years previously, developed a small umbilical hernia during her fifth pregnancy. The hernia increased slowly to the size of a man's head and, several months before hospital entry, exhibited erosions and ulceration of the overlying skin. Following sudden severe abdominal pain, the intestine prolapsed through a defect in the skin. At the time of hospital admission that same day, there was an eventration of 80 to 100 cm. of small intestine. Immediate operation, with replacement of the carefully cleansed bowel into the abdomen, correction of the defect in the abdominal wall, and adequate antibiotic therapy, was followed by prompt recovery without the development of clinical peritonitis.

Thirty-three of the reported patients with spontaneous rupture of hernia were women. This complication also occurred in 2 men and 3 children. In 8 cases the sex was not given. Alterations in the abdominal wall caused by pregnancy, and procrastination by women in deciding on surgical repair of the hernia may explain this difference in the incidence in the sexes. Spontaneous rupture of hernia is a complication encountered predominantly in the middle-aged and elderly, and usually occurs in large hernias.

Umbilical (16) and ventral (18) hernias accounted for three-fourths of the cases. Inguinal (7) and femoral (5) hernias rarely developed this complication. In 21 patients the hernia had arisen in a scar or had recurred following operation. None of the ruptured umbilical hernias had been surgically treated previously, but most of the inguinal and femoral hernias were recurrences. Rupture was attended by eventration of one or more loops of small intestine in 42 of the 46 patients, and by prolapse of the omentum in only 4 patients.

Surgical repair, although usually accomplished within hours of the rupture, has been successful, with survival of the patient, even when delayed as long as 10 days. In 2 patients, gangrene necessitated resection of a segment of intestine and in 2 others, inability to replace the prolapsed bowel led rapidly to death. Severe "drawing" pains, which occurred in many patients before and at the time of rupture, are attributable to sudden pull on the mesentery. Shock, a not infrequent finding, may have the same basis.

Pressure atrophy of the skin with circulatory disturbances and loss of elastic fibers follows prolonged pressure from within the hernia. Exogenous cutaneous changes (scars, eczematoid conditions, excoriations, and ulcers) may contribute to the weakening of the skin, so that rupture may follow insignificant trauma or increased abdominal pressure due to coughing, sneezing, screaming, vomiting, defecation, or heavy lifting.

Prompt hospitalization and emergency repair of the defect are mandatory. As a first-aid measure, the prolapsed bowel should be protected by sterile dressings, preferably moistened with sterile saline solution. In no event should attempts be made to cleanse and replace the prolapsed viscera prior to hospitalization. When there are signs of strangulation, assessment of the extent of reversibility of the vascular changes is possible only after the defects in the skin and in the abdominal wall have been surgically enlarged. A prolapsed omentum should be resected rather than replaced. The possibility of tetanus infection must be kept in mind. Before the turn of the century, treatment was limited to surgical closure of the cutaneous defect, and in some patients a second rupture occurred years later at the site of repair. Since 1905, definitive repair of the hernia during the emergency operation has been the rule. —*Elmer V. Dahl, M.D.*

GASTROINTESTINAL TRACT

Artificial Stomach and Proteolytic Function (Ersatzmagen und proteolytische Leistung). E. HIENZSCH. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1958, 288: 304.

THE CHOICE AND EXTENT of stomach resection are not merely surgical problems but also involve the consideration of the maintenance of proteolysis at its optimum level. Even a small remaining segment of stomach is advantageous to the patient's digestion. However, total gastrectomy is occasionally indicated, particularly in cases of cancer. In such cases procedures which are aimed at passing the food through the duodenum are functionally best.

When total gastrectomy is done there are three chief ways of restoring continuity, esophagoduodenostomy, esophagojejunostomy, and the interposition of a jejunal segment. The last named is given special attention in this article. This procedure is one of great magnitude and, although there is a divergence of opinion as to whether the "artificial stomach" can or cannot produce proteolytic ferments or be proteolytically effective, there is no question but that it provides the best possible restoration of "stomach function." Postoperative observation of vigorous churning and mixing motions in the duodenum evidencing optimal utilization of its absorptive capacities, seems to explain the astonishingly gratifying results.

In this article special attention is given to the morphology of the "artificial stomach" in its relation to the proteolytic activity. Progressively improved proteolysis with release of essential aminoacids, as shown in eight graphs, has been found during studies made at the Surgical Clinic of the University of Jena. Four weeks after surgery the "artificial stomach" has not yet developed, and tests show a rapid transit of contrast material from the esophagus into the duodenum. Six months after surgery, however, identifica-

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tion is made of a "fundus," an "antrum," and some kind of a "pylorus." These seem to produce some reduction in the speed of passage as well as a reservoir and a mixing function. The passage of the contrast material into the duodenum in portions results in a small amount still remaining in the "artificial stomach" after 2 hours. The assumption is made that duodenal juice and admixed bile flow retrograde during the process of digestion.

Satisfactory proteolysis as shown by the curves on the graphs is attributed not only to pancreatic enzyme function, but also to locally produced proteases and to the improved mechanical function of the "artificial stomach." —*Max L. Smith, M.D.*

Surgical Treatment of Massive Upper Gastrointestinal Hemorrhage. Donald R. Cooper, LeRoy H. Stahlgren, Loring E. Sylvester, and L. Kraeer Ferguson. *Gastroenterology*, 1958, 34: 947.

The management of patients with massive gastrointestinal hemorrhage is still a major problem in medicine. Despite all methods of management a certain percentage of patients will die of exsanguination. If all patients with massive bleeding are operated upon, however, a great many unnecessary gastrectomies will be performed.

The clue to the ideal program is to determine which patient will become exsanguinated if surgery is not performed. This is far from an easy procedure. Patients over 45 years of age in most series are considered to be more serious bleeders. Gastric ulcers have a higher mortality from hemorrhage. Hematemesis has a worse prognosis than melena. Probably the most important guide to selecting patients for surgical management is to determine how profound their response is to the hemorrhage and to their replacement therapy.

If bleeding is massive and the patient requires more than 500 c.c. of blood in every 8 hour period for 48 hours, immediate surgery is recommended if the bleeding can be determined to be above the ligament of Treitz, not due to esophageal varices, or to a bleeding tendency.

The procedure of choice recommended by the authors is gastrectomy. They believe that most lesions will be seen or felt externally. In the event that no lesion is found they are of the opinion that "blind or empiric" gastrectomy is definitely indicated to control the frequently occurring superficial erosion. They carefully inspect the stumps of duodenum and stomach to make sure that the bleeding point is not left behind, but believe that preliminary gastrotomy or duodenotomy is a waste of time and unrewarding.

The series reported consists of 46 cases. There was a 19 per cent mortality, but the authors feel that the salvage of 81 per cent is good because of the general severity of the bleeding; many of the patients would have died without surgery.—*Harold M. Unger, M.D.*

The Occurrence of Carcinoma of the Stomach After Resection of the Stomach for Ulcer (Ueber das Stumpfkarzinom nach Magenresektion wegen Ulcus). Ch. Debray, M. Bouvry, and Ph. Roches. *Schweiz. med. Wschr.*, 1958, 88: 631.

Since 1950, the authors have observed 11 cases of carcinoma of the stomach occurring after gastric resection for benign ulcer. They have also collected 113 similar cases from the literature. These are cases in which the original ulcer was known to be benign, or cases in which at least 5 years elapsed between the time of the resection and the development of the gastric carcinoma. There is an average of 14 years and 9 months between the time of resection and the development of the tumor, the periods ranging from 3 to 37 years.

The onset is heralded by pain after eating, anorexia, vomiting, dysphagia, hematemesis, weight loss, and anemia. It is pointed out that, of course, whereas these symptoms might suggest the development of a carcinoma, x-rays and gastroscopy are the only really helpful means of diagnosis.

There are several points of interest in the article. In the first place, it is brought out that in 49 cases, the carcinoma was found in the fundus of the stomach or at least remote from the line of anastomosis. There were, however, 31 cases in which the carcinoma was found at the line of anastomosis. With the passage of time the carcinoma tended to form a complete ring around the anastomotic area, but rarely did it pass the anastomotic line to invade the jejunum. The occurrence of carcinoma in the remaining stomach seemed to have nothing to do with the type of surgery originally carried out, that is, whether it was a Billroth I or a Billroth II type of resection. The possible etiology of the carcinoma under these circumstances was considered, with the feeling that perhaps the reduction in acidity could be important and point out the incidence of carcinoma in people with pernicious anemia. It is thought that perhaps the occurrence of gastritis, especially the atrophic type which is found more frequently in people who have had a gastric resection than in the normal population, is of importance. In conclusion the authors state that the outlook is extremely grave for these people.

—*Robert C. Combs, M.D.*

Involuntary Gastroileostomy (La gastroileostomia involontaria). Sabino Chieppa. *Arch. ital. chir.*, 1958, 83: 273.

A serious complication that may follow gastric resection is spontaneous gastroileostomy. The author reviewed the literature and was able to collect approximately 117 reported cases of this complication. He discusses the entity at length and presents 3 personal cases. Among 120 cases of gastroileostomy reported during the period from 1881 to 1956, 69 were simple cases and 42 were associated with gastric resection, in 9 cases no data was given as to whether the condition was or was not associated with gastric resection. From a review of these cases, it was evident that this complication may occur anywhere from a few days to 36 years after the gastric surgery. The symptomatology of this complication has a rather rapid evolution, consisting of mild to severe epigastric distress accompanied by frequent diarrheal type of stools, eructation, and even fecal emesis. This illness is accompanied by the rapid loss of minerals, proteins, and enzymes with rapid malnutrition and inanition. If it is not corrected, it is usually fatal.

Many theories are explained for the cause of this complication, and in the previously reported cases,

only a small percentage of anomalies in the anatomy of the gastrointestinal tract were found. From this study, the author has no suggestions as to the technique of doing a gastrojejunal anastomosis, except that he states that one should be alert to possible anomalies of the gastrointestinal tract.

The diagnosis of this complication can be made accurately with roentgenological examination. Once a diagnosis is made, the abdomen should be re-explored, the pathological anastomoses should be separated and closed, and, if necessary, the involved segment of ileum should be resected and the primary anastomosis should be made at the site of the involvement.

The author stresses the importance of preoperative preparation of the patients because of the severe malnutrition, secondary anemia, electrolyte imbalance, and dehydration. In reviewing the literature, he observed that the patients who were not reoperated upon, died, a 100 per cent mortality. Of the remaining patients, who were subjected to surgery, 11 of a surgical series of 99 died. In 3 of these death was due to peritonitis. —*Roland A. Manfredi, M.D.*

Gastrectomy and Loss of Weight. I. D. A. JOHNSTON, RICHARD WELBOURN, and KATHLEEN ACHESON. *Lancet*, Lond., 1958, 1: 1242.

LOSS OF or failure to regain weight after gastrectomy has long been a problem facing the surgeon. The problem has been related to the extent of the resection, the type of anastomosis (Billroth I showing less loss of weight), reduced intake, postcibal symptoms, and decreased utilization of food values.

In the series studied, it was shown that the patients who lost weight before operation tended to regain some of their weight. Those gaining weight preoperatively, tended to lose some. In attempting to control the weight loss, several methods were utilized. Intramuscularly administered iron and vitamin B_{12}, testosterone, iproniazid, and careful dietary supervision were used. The iron and B_{12} have not produced weight gain. Diet, testosterone, or iproniazid all produced about the same effect, 4 lbs. in eight weeks. Diet is probably the most effective method but is complicated, costly, and requires very close supervision. Other methods are less reliable.

—*Harold M. Unger, M.D.*

Malignant Tumors of the Small Intestine (Ueber maligne Duenndarmtumoren). K. PASCHOLD. *Zbl. Chir.*, 1958, 83: 815.

ROENTGENOLOGICAL DIAGNOSIS of the tumors of the small intestine is seldom made at the present time. This may well result from the fact that the small intestine often "escapes" from accurate fluoroscopy during the course of an upper gastrointestinal series.

Carcinoma of the small intestine is a rare entity per se (2.5 to 6 per cent of all intestinal tumors). It occurs as often in the duodenum (50 per cent) as in all other segments together. Carcinomas of the duodenum are currently divided in three groups: suprapapillary (22.5 per cent), periampullary (59.2 per cent), and infrapapillary or juxtajejunal (18.3 per cent).

Clinical symptoms are anything but pathognomonic: ill-defined upper abdominal pain, occasional vomiting which occurs 60 to 90 minutes after meals, and moderate loss of weight. Laboratory findings are of little help, except for the occult blood test which is usually positive.

Carcinomas of the jejunum and the ileum (40.8 per cent) manifest themselves by the same clinical and laboratory findings and, most of the time, are detected only when intestinal obstruction has developed. This symptom develops earlier with the ulcerative, constrictive form of the tumor than with the sprouting, expansive variety. Histologically, the tumor is usually found to be an adenocarcinoma.

Metastases are commonly admitted to develop tardily, in the mesentery, the liver, the pancreas, and the neighboring lymph nodes.

For an earlier detection of these rather "silent" cancers, the author thinks that whenever a routine barium swallow demonstrates questionable pictures, injection of the contrast liquids through a Miller-Abbott tube might sometimes prove helpful. Duodenal suction and examination of the sediment according to Papanicolaou's technique have recently been advocated by Mackenzie and Miller, who are of the opinion that these procedures might also help in the early diagnosis of carcinomas of the duodenum. Three cases of malignant tumor of the small intestine, with accurate history, clinical and laboratory findings, treatment, and histopathological reports make up this most interesting article. There is a large international bibliography. —*C. A. Muller, M.D.*

Diverticulosis of the Colon and Its Complications (Die Divertikulose des Dickdarms und ihre Komplikationen). H. KÜHNE. *Zbl. Chir.*, 1958, 83: 801.

THE AUTHOR gives a general review of the problem of diverticulosis of the colon. The disease affects 5 per cent of an unselected population, of which 12 to 15 per cent develops diverticulitis later on. The majority of the cases are detected between the ages of 40 and 60 years. It is believed that the main etiological factor is a weakening of the intestinal musculature. Passage from the state of diverticulosis to that of diverticulitis may be due to fecal stasis and secondary inflammation.

Four stages of the disease should be differentiated, i.e.:

1. Diverticulosis, an anatomical condition which most of the time is free of any symptom, except constipation.

2. Diverticulitis with spasm, in which the symptoms are: pain in the lower abdomen, tenderness to palpation, occasionally guarding and temperature, and much more constantly an irregularity in the bowel habits.

3. Diverticulitis with complications: (a) perforation with pelvic peritonitis, which manifests itself by localized tenderness as well as rebound, and pain in the Douglas pouch on rectal examination; (b) fistulization either to the skin or to the adjacent organs.

The treatment of perforated diverticulitis is outlined: temporary proximal colostomy followed by resection of the colon. The interval between the two procedures varies according to the authors from 4 to 12 months. Treatment of fistulized diverticulitis is the same as that of perforated diverticulitis, resection of

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the colon, after which the fistula usually closes spontaneously.

4. Diverticulitis with carcinoma: according to the majority of workers, diverticulitis seldom occurs in combination with a malignant lesion of the colon (in 0.43 per cent of the cases, according to J. Rowe), and it seems unlikely that it should represent a precancerous condition.

The differential diagnosis between the two diseases is greatly facilitated by rectoscopy, yet roentgen-ray diagnosis is prevalent in most cases.

The prognosis of diverticulitis with simultaneous carcinoma is poor; 5 year cure averages 39 per cent (Morton), whereas the prognosis of 5 year cure is 52.5 per cent when carcinoma alone is present. The poorer results in the former condition are probably due to the delayed diagnosis of the malignant component thereof as all the symptoms actually point to the diverticulitis.

Eleven cases with extremely accurate histories, laboratory findings, and follow-ups are presented and form the basis of this very well documented article. There is a large international bibliography.

—*C. A. Muller, M.D.*

Adult Intussusception and Carcinoma of the Colon. George B. Sanders, William H. Hagan, and David W. Kinnaird. *Ann. Surg.*, 1958, 147: 796.

Five patients with carcinoma of the colon had complicating intussusceptions. In a review of more than a thousand intussusceptions reported in English and American publications about a fourth were found to be colocolic, and of those, two-thirds were caused by malignant conditions. Nonmalignant tumors which cause colonic intussusception occur in younger persons and run slower courses than do the malignant tumors. When a cancerous intussusception occurs, the surgical procedure should be a resection of the same extent used for cancer in similar bowel segments; the resection should not be limited because of the fact of intussusception.

In the discussion of this article, J. Baker notes that low sigmoid or upper rectal lesions may distend the intussuscipiens, i.e., the rectum. In that condition anastomosis of the unequal diameters is better accomplished by the side-to-end application of the distal sigmoid to the lower rectum.

—*Leonard D. Rosenman, M.D.*

Carcinoma and Ulcerative Colitis; a Clinical-Pathologic Study. Moshe B. Goldgraber, Eleanor M. Humphreys, Joseph B. Kirsner, and Walter L. Palmer. *Gastroenterology*, 1958, 34: 809.

In an effort to determine the relationship of colonic carcinoma to chronic ulcerative colitis, the authors studied a group of 792 patients with ulcerative colitis. Eighty-six patients in this group died of a variety of causes including 14 patients known to have died of carcinoma of the colon. Case histories of these 14 cases are presented along with photomicrographs of the lesions. There were 9 women and 5 men in this group. The mean age at the time of death was 41 years with an age range of 19 to 55 years. The mean age at the time of diagnosis of the cancer of the colon was 37.8 years. Thus colonic cancer in those patients having chronic ulcerative colitis would appear to occur at an earlier age than the "ordinary" colonic cancer occurs. The mean duration of the symptoms of ulcerative colitis before carcinoma developed in the colon was 17 years. When carcinoma did occur, it appeared to have a tendency to a more diffuse distribution throughout the colon as compared with the usually accepted 37 per cent of carcinoma found in the rectum in the "ordinary" colonic carcinomas. The lesion also is frequently a less well circumscribed lesion and may originate in multiple foci.

The second part of this clinicopathologic study compares the number of deaths from colonic cancer to be expected in the population at large in the United States, with those from carcinoma of the colon when associated with chronic ulcerative colitis. For statistical comparison, figures from the United States Bureau of Vital Statistics dealing with deaths from selected causes were used. Calculations of the expected deaths from carcinoma of the colon were made on a race-age, and sex-specific basis. It was concluded that patients with chronic ulcerative colitis have an eightfold greater frequency of death from carcinoma of the colon than persons from the population at large of a similar age, sex, and race. There was a fourfold increase in frequency of death from rectal cancer.

—*Edmund A. Gorvett, M.D.*

In Which Phase of Ulcerative Colitis Does Colonic Cancer Occur? Nanna Svartz and Torsten Gillnäs. *Am. J. Digest. Dis.*, 1958, 3: 537.

This study includes 505 patients with ulcerative colitis who were observed during a 15 year period. The article is illustrated with many roentgenographic and histologic photographic reproductions, and a chart which summarizes much of the information that appears in the body of the paper.

The frequency of carcinoma was 3.1 per cent; however, if only those patients were considered whose disease started before the age of 20 years, the frequency was 4.3 per cent. In most of the individuals in whom cancer developed the age of onset was below 30 years. The interval between the onset of symptoms and the development of cancer was between 7 and 12 years in most cases. The active phase of the disease had been quite widespread in most of the 17 cancer cases.

Carcinoma seemed to begin at a time when the disease was inactive, during the healed phase. All but 2 of the patients were working until the onset of cancer symptomatology. Roentgenographic and histologic examination supported the thesis of cancer developing in patients with healed ulcerative colitis.

The histologic changes during the various phases of ulcerative colitis are discussed, especially the findings in the chronic and healed stages. Chronicity is characterized by round-cell infiltration within the deep layers of the mucosa and submucosa. In addition to lymphocytes, there may be collections of plasma cells and a few polymorphonuclear leucocytes. During the healing phase connective tissue increases in the areas of previous round-cell infiltration; however, some foci of round-cell infiltration persist for many years. A thickening of the muscularis mucosae is frequently noted resulting from fibrosis, infiltration of lymphocytes, and possibly hypertrophy of muscle cells.

The authors speculate that the change to cancer is initiated by poor nutrition to the mucosa because of scar formation. A second thesis suggests that the acute phase initiates a precancerous type of cell which may eventually change to frank malignant neoplasm.

—*R. L. Lawton, M.D.*

The Blood Supply of the Rectosigmoid Junction and Its Surgical Significance (Die Blutversorgung des Darmueberganges zwischen Sigma und Rectum und ihre chirurgische Bedeutung). Zs. PATAKY and A. KARÁCSONYI. *Chirurg*, 1958, 29: 248.

THE ANATOMY of the arteries of the pelvic colon and upper rectum is critically important in the operations for carcinoma of the lower large bowel in which, for whatever reason, the rectosigmoid junction is not extirpated. The arterial blood supply of this segment of bowel is variable. No fixed rules regarding the vascular anatomy can be formulated. The superior hemorrhoidal artery provides the major blood supply for the rectum, and in 97 per cent of the patients this vessel is the continuation of the inferior mesenteric artery. The sigmoid arteries are less regular. The anastomosis of the superior hemorrhoidal artery with the sigmoid arteries is crucial in operations in this region.

Sudeck defined a point proximal to this anastomosis up to which the superior hemorrhoidal artery could be ligated without endangering the rectum. Although the validity of this point has, in general, been upheld, there are cases in which necrosis of the rectosigmoid junction has occurred despite careful observation of Sudeck's concepts and, conversely, in some cases viability has been maintained despite distal ligation.

The authors performed injection studies via the inferior mesenteric artery of the pertinent vessels in 22 cadavers. In 20 of these, the sigmoid artery arose as a separate branch of the inferior mesenteric artery. The sigmoidea ima arose as a separate branch from the inferior mesenteric artery in two specimens. A separate arteria sigmoidea media was found several times. It usually served to augment the inferior sigmoid artery (sigmoidea ima). The single arterial arcade formed by the superior hemorrhoidal-sigmoid artery anastomosis gives rise to end arteries, which supply the 10 to 12 cm. of the colon above the mesorectum. Ligation of these end arteries prevented filling of the distal vessels with injection media, which indicated that in this segment of bowel there are no adequate marginal anastomoses.

In 2 cadavers there were two and three anastomoses, respectively, between the sigmoidea ima and the superior hemorrhoidal arteries. Such variations may explain the reported survival of the rectosigmoid junction despite the apparent ligation of the superior hemorrhoidal artery distal to Sudeck's point. In these studies, ligation of the inferior sigmoid artery did not prevent filling of the anastomotic arcade. Ligation of the superior hemorrhoidal artery proximal to the anastomosis, however, greatly delayed filling of the anastomotic arcade and its branches, which indicated that the superior hemorrhoidal artery provides the major portion of the blood to this segment of bowel.

The diameter of the anastomotic artery varied from 0.25 to 2.5 mm. in different patients. In those patients with a narrow anastomotic channel, ligation of the superior hemorrhoidal artery would lead to ischemia of the bowel supplied by the end-arteries arising from the anastomotic arcade. In such cases the middle hemorrhoidal artery (which is absent in 40 per cent of patients) is inadequate for the blood supply of the upper third of the rectum.

The authors describe a method for determining the functional sufficiency of the anastomotic arcade at surgery. With the superior hemorrhoidal artery clamped at the site of contemplated ligation, 15 to 20 c.c. of 1 per cent methylene blue are injected into the inferior mesenteric artery. If the anastomosis with the sigmoidea ima is functionally adequate, the rectosigmoid junction is colored as intensely by the dye as the remainder of the lower bowel, and the superior mesenteric artery may be safely ligated at the clamp.

—*Elmer V. Dahl, M.D.*

Anatomoclinical Principles and Technical Problems in the So-Called Conservative Surgery of the Rectum and of the Sigmoid Colon Tumors with a Special Reference to the Intestinal Pull-Through Techniques. LUIGI IMPERATI. *Scientia med. ital.*, 1958, 6: 306.

THERE IS no doubt that in recent years more and more attempts are being made to preserve the sphincters in operations for carcinoma of the rectum and lower sigmoid colon. Provided that radicality is not markedly sacrificed for the sake of preserving the anal sphincters, the preference for a sphincter-saving operation is obvious.

However, two main problems constitute the major objections to pull-through procedures. The first is the total or partial incontinence which often ensues. It is unquestionably due to the denervation of the lowermost 10 cm. of anorectal mucosa, and is exemplified by the Babcock-Bacon procedure in which the sphincters are spared but the mucous membrane is injured by suturing the pulled-down colon to the anal margin. The second problem is much more serious, and consists of the relatively high frequency of circulatory disturbances in the pulled-down colon. These can cause the suture line to disintegrate, and lead to peritonitis, abscess, or fistula formation.

The author reviews the anatomy of the colon and rectum with especial reference to the vasculature. Arteriograms of excised specimens reveal the several types of variations in the inferior mesenteric blood supply to the colon and rectum. With these studies as background material, the author describes the technique used at the University of Rome Clinics as developed by Valdoni since 1950. The technique is designed to assure radical extirpation of the tumor and to safeguard the vasculature of the bowel.

The upper limit of the resection is marked by a ligature around the colon. The blood supply is severed and the colon freed. The patient is then placed in lithotomy position. An assistant stretches the anal sphincter and introduces a forceps carrying a large piece of gauze into the rectum. The operator determines the position of the gauze and forceps by palpation and places a tie under the gauze around the shaft of the forceps. The assistant pulls the rectum down until it is everted for a distance of about 10 cm.

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The outer full-thickness layer of the evaginated bowel is then cut through circularly. The inner wall is then pulled out further, gently and with some guidance and propulsive aid from the abdominal operator. The bowel and the severed mesentery are delivered in this manner. The integrity of the blood supply can be carefully watched. Compression and kinking of blood vessels, often responsible for devascularization of the pulled-through segment, are controllable.

The posterior peritoneum is reconstructed around the pulled-down colon, and the abdomen is closed. The exteriorized bowel is now amputated at the level of the outer bowel layer. The two layers are sutured circularly and immediately reduced. This suture, however, has serious drawbacks because it is subject to inflammatory reaction. At the present time, therefore, the author prefers to leave the two evaginated bowel layers unsutured. Retraction is prevented by anchoring the outer layer to the skin. The two layers of bowel, in contact with one another, coalesce in 10 to 15 days. After this time they are trimmed and replaced. —*Harold Laufman, M.D.*

Carcinoma of the Colon and Rectum in Persons Under 20 Years of Age. M. Tischer Hoerner. *Am. J. Surg.*, 1958, 96: 47.

Age is no barrier to the occurrence of carcinoma of the colon and rectum in young persons. The author reviews 189 cases of carcinoma of the rectum and 73 cases of malignant disease of the colon in patients under 20 years of age. Carcinoma of the lower sigmoid and rectum occurs nearly three times as commonly as in other segments of the colon in children. The lesions of the right half of the colon are generally composed of large polypoid fungating tumors which grow to considerable proportions before producing symptoms. As in the adult, the left-sided lesions tend to encircle the colon in a constricting ring. The symptoms and signs of malignant conditions of the large bowel in children are very similar to those encountered in the adult. The author advises radical resection of the growth. The prognosis of carcinoma of the colon and rectum in children is not good. The longest periods of survival reported are the cases of Webster and Scholefield. The former reported a patient who lived 4 years after operation and the latter a youth who showed no demonstrable recurrence 7 years after operation. One reason for the poor prognosis is failure in the early diagnosis of bowel neoplasms in children. The youngest patient who has been reported with this disease was 3 years and 3 months of age.

—*Alan Thal, M.D.*

Studies on Symptom Complex After Gastric Operations (Untersuchungen zum Beschwerdenkomplex des Magenoperierten). R. Fischer. *Deut. med. Wschr.*, 1958, 83: 1124.

The term "dumping syndrome" is frequently applied to a variety of conditions which have nothing in common.

To evaluate gastric resection for peptic ulcer it is necessary to review a relatively large material at various postoperative periods. Furthermore, it is essential to compare the preoperative conditions with the ones following the resection.

Follow-up examinations of 583 patients operated on for gastric or duodenal ulcers included the following determinations: symptom complex, blood, serum proteins and ions, and utilization of food. The periods between the operation and the first follow-up study varied from 4 weeks to 20 years.

Only 12 per cent of the patients operated on within a period of 2 years were asymptomatic. With the exception of the dumping syndrome, the complaints were neither uniform nor characteristic, as similar symptoms were recorded also after cholecystectomies. They showed a tendency to spontaneous recession in the course of time. The typical ulcer pain was practically absent. Ninety per cent of all the patients were able to work. No definite relations could be established between the patients' age and the intensity or frequency of their postoperative symptoms.

Secondary anemia occurred with a slightly higher frequency in women than in men, but was of no clinical importance.

Determinations of total proteins and albumin-globulin ratios before and after operation for an ulcer failed to reveal any differences. In contrast to these findings was the disappearance of dysproteinemia after gastrectomy in cancer patients. Changes in the albumin-globulin ratios reappeared only when the formation of metastases took place. No influence of gastric resection on serum sodium or chlorides could be demonstrated. Slight postoperative hypokalemia developed in 5 per cent of the entire series.

Utilization of food was tested by examination of the feces for neutral fat and fatty acids. No untoward effect of the operation could be detected. On the other hand, the utilization of food was greatly impaired by more extensive operations, such as subtotal or total gastric resections performed on cancer patients.

—*Joseph K. Narat, M.D.*

LIVER, GALLBLADDER, PANCREAS, AND SPLEEN

Measurement of Portal Venous Pressure by Hepatic Vein Catheterization and by Direct Puncture During Surgery (Messung des Pfortaderdruckes mit Lebervenenkatheterisierung und intraoperativer Direktpunktion). E. S. Bücherl, J. Koncz, and R. Bücherl. *Chirurg*, 1958, 29: 241.

Hepatic vein wedge pressure is representative of portal venous pressure by the same mechanism which permits left atrial pressure to be measured with a catheter inserted so far into a pulmonary artery that a branch is completely occluded. The hepatic veins have no valves and there are no anastomoses proximal to the freely communicating hepatic sinusoids. Hepatic wedge pressures are obtained by inserting a Cournand No. 7 or 8 catheter through the left basilic vein and right atrium into the inferior vena cava and thence into a hepatic vein, and advancing the catheter far enough so that a branch is completely occluded.

The surgical management of portal hypertension with hemorrhage due to varices necessitates the differentiation of prehepatic from intrahepatic obstruction of the portal vein. In hepatic cirrhosis, scar tissue proliferation leads to increased resistance to portal venous flow. With a constant volume flow, portal

venous pressure must rise. Portacaval shunt is useful only in such circumstances. Prehepatic obstruction is usually the result of thrombosis of the portal, mesenteric, or splenic veins. In such cases the pressure in portal venous radicals within the liver is normal and portacaval anastomosis is useless. Hepatic vein catheterization provides information to differentiate prehepatic from intrahepatic obstruction of the portal vein. The procedure is relatively free of risk, and is performed on nearly all patients scheduled for shunt operation at the Göttingen University surgical clinic.

The authors report hepatic wedge pressures, representing portal venous pressures, obtained from 27 patients. Seven of these patients came for cardiac catheterization for evaluation of pulmonary disease. In these 7 patients, presumably with normal hepatic and portal venous pressures, the hepatic wedge pressure, in a branch occluded by the catheter (portal venous pressure), was 6+0.54 mm. Hg. With the catheter slightly withdrawn, the true hepatic venous pressure was 4+0.66 mm. Hg. The pressure in the vena cava was 3.1+0.41 mm. Hg.

In 15 patients with portal obstruction due to intrinsic liver disease, the hepatic wedge pressure was 29.6+1.70 mm. Hg. In these same patients, the portal venous pressure measured directly at operation was 27.9+1.59 mm. Hg. The value obtained by direct measurement correlated very closely with that obtained by the wedge pressure method. True hepatic venous pressure in these patients was 7.3+0.91 mm. Hg. The pressure in the vena cava was 3.8+0.57 mm. Hg as measured by catheter, and 7.4+0.58 mm. Hg when measured directly at operation. The values for portal venous pressure in patients with intrahepatic block were considerably higher than those reported by others. The authors believe this difference was due to differences in patient selection.

In 5 patients with prehepatic portal obstruction the hepatic wedge pressure was 11+0.71 mm. Hg. Pressure in a gastric vein, measured directly at operation, was 16.3+2.72 mm. Hg. —*Elmer V. Dahl, M.D.*

Clinical Care of Liver Trauma (Zur Klinik der Leberverletzung). M. REIFFERSCHEID. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1958, 288: 361.

THE PROGRESSIVE ADVANCEMENT of mechanization and the increasing speed of work and traffic have resulted in the ever increasing frequency of accidents and trauma to the liver. Because of the location and shape of the liver it is involved in a high percentage of abdominal injuries and the mortality from this type of injury and its complications has been 61.6 per cent during the period from 1904 to 1946.

Nothing has been overlooked during the past 60 years in efforts to improve methods of treatment and to eliminate lethal complications. As evidenced by the results over the past 20 years these efforts have not been entirely unsuccessful.

This article contains a number of graphs showing the percentage of trauma to the liver among abdominal injuries, the parts of the liver subjected to trauma, the frequency and nature of associated injuries, the increase in mortality due to additional injury to adjacent organs, the percentage of symptomatology in liver trauma, the percentage of intra-abdominal and intrathoracic liver trauma, shock therapy, mortality related to age, and the interval between injury and the institution of treatment.

The high mortality in cases of injury to this brittle organ is explained by shock due to massive hemorrhage, loss of bile, and destruction of parenchyma, as well as to the large number of serious late complications. A systolic pressure of 50 to 60 on admission is, regardless of age, the most serious evidence that shock will be irreversible and carries the worst prognosis.

The route of injury to the liver, whether transabdominal or transthoracic, is of importance in evaluating the seriousness of the injury. The addition of a thoracic injury adds the complication of respiratory embarrassment. The nature of the injury to the liver itself is of no less importance in prognosis. One of the most serious injuries is a transverse laceration of the right lobe. This injury is responsible for about 70 per cent of the deaths. Incised or bullet wounds only account for 12 per cent. The fact that perforating through-and-through injuries are less apt to develop complications than a penetrating injury is believed to demonstrate the value of drainage in the prevention of stasis of secretions and the formation of cavities. These problems are increased by tamponage.

The mortality of liver trauma dropped after the Second World War to 23 per cent. An analysis of the available pertinent world literature made at the Surgical Clinic of the University of Bonn showed that improved therapeutic principles were responsible for the improved results.

In addition to more exact diagnostic evaluation and earlier institution of therapy, the following factors have obviously been responsible for the satisfactory results: (1) routine initial shock treatment, (2) standardization of care of liver wounds with widest possible avoidance of tamponage, (3) early resection of anoxic portions of liver tissue with adequate hemostasis, and (4) systematic treatment and prevention of complications during the postoperative period. —*Max L. Smith, M.D.*

Correlation of Hernia with Portal Cirrhosis; A Re-evaluation of the Role of Ascites. H. TANYOL. *Am. J. Digest. Dis.*, 1958, 3: 444.

NUMEROUS REPORTS have mentioned the concomitant occurrence of portal cirrhosis and hernia with the prevailing view entertained by many that the increased abdominal pressure arising from the ascites is of importance in the production of hernia.

In the present study data were obtained from 66 consecutive male patients with cirrhosis whose ages ranged from 38 to 76 years. The diagnosis of portal cirrhosis was substantiated by gross and histologic examination of material obtained at autopsy, by hepatic puncture, or by surgical biopsy. A control group used in the study included patients without cirrhosis or ascites. Only inguinal, femoral, ventral, epigastric, and diaphragmatic hernias were included.

Twenty-five of the 66 patients with cirrhosis had hernias, either single or multiple, making a total of 35 hernias in this group. Statistical analysis shows a highly significant difference in the incidence of hernia in patients with and without cirrhosis, but there is no evidence that hernia develops in the cirrhotic patient

in association with his ascites. It was found that the incidence of hernia was high in the cirrhotic groups regardless of the presence or absence of ascites. In evaluating the chronology of the hernia, hernia repair, and ascites in 12 cirrhotic patients it was found that 14 out of 15 hernias preceded the onset of ascites.

The present findings confirm the high incidence of hernia in cirrhosis; however, the data do not associate the presence of ascites in the development of hernia. It is believed rather that the high incidence of hernia is due more to an inherent defect of the connective tissues than to ascites. The divergence of opinion in the author's series and in series previously reported might be due to the fact that first-hand observations instead of record room material were used, noncirrhotic controls were used, the time interval between onset of hernia and ascites was considered, hernia repairs were included in the history of patients, and the study was restricted to male patients.

—*W. Harrison Mehn, M.D.*

A Very Large Epithelial Cyst of the Liver (Voluminosa cisti epiteliale del fegato). ALBERTO LUISI. *Gior. ital. chir.*, 1958, 14: 131.

THE AUTHOR reports the case of a large single cyst of the liver, the size of a coconut, which was partially resected and cauterized, and the cavity obliterated with sutures.

He believes that epithelial cysts of the liver are very rare and should be classified with the hamartomas. The diagnosis is difficult and careful differentiation should be made from the echinococcus cyst. The prognosis of epithelial cysts is good following surgical removal.

—*Alexander J. Conte, M.D.*

Oral Cholecystography; An Evaluation of Its Accuracy. HILLIER L. BAKER, JR. and JOHN R. HODGSON. *Gastroenterology*, 1958, 34: 1137.

THE AUTHORS have attempted to evaluate three modifications of the oral cholecystographic examination carried out at the Mayo Clinic in Rochester, Minnesota at different periods in the last 25 years. The evaluation compares the method employed by Kirklin in 1933 with the modification used in 1950 and the technique employed in 1955. The procedure in 1933 consisted of having the patient ingest a solution containing 4 grams of sodium tetraiodophenolphthalein after an evening meal omitting fatty foods. On the following morning the patient was given a rectal injection of warm saline solution and cholecystograms were made at 14, 16, and 20 hours after the original material was ingested. The last roentgenogram was made after the patient had taken a glassful of milk and cream. Roentgenograms were made with the patient lying either in the prone or oblique position on a table equipped with a flat Potter-Bucky grid. The technique employed in 1950 was much the same with the following exceptions: the material ingested was iodoalphionic acid (priodax) in a dose of 3 grams; the rectal irrigations were discontinued; roentgenograms were made with the patient in the right lateral decubitus position as well as in the prone position. In 1955 the medium was changed to iophenoxic acid (teridax) in a dose of 3 grams. The other details of the examination were unchanged.

The histories of all patients having cholecystograms during these particular years were thoroughly reviewed. The surgical and pathologic descriptions of the gallbladder were carefully studied as were all of the old roentgenograms.

Of 1,223 diagnoses made by cholecystography and subsequently verified by abdominal exploration in the year 1950, 2.7 per cent were noted to be in error. Of the 1,180 diagnoses made by cholecystography in 1955, 2.4 per cent were found to be in error. From these data and from Kirklin's study in which 5 per cent of 732 diagnoses were erroneous, one may safely state that the roentgenologic assessment of the condition of the gallbladder, be it normal or diseased, is an extremely reliable guide and its accuracy, which lies within the range of 95 to 98 per cent, compares favorably with that of any examination the radiologist has at his disposal.

Although the cholecystogram is exceedingly accurate, the authors indicate that almost a third of the errors committed might have been rectified prior to surgical intervention. When the report specifically indicates the presence of stones, polyps, papillomas, or adenomas in the functioning or nonfunctioning gallbladder, the accuracy is exceptionally high. In the two series reported by the authors only 12 out of 1,331 such diagnoses were not substantiated by subsequent surgical and pathologic proof; this represents an error of 0.9 per cent.

When the cholecystographic diagnosis was based on the concentration of medium within the gallbladder rather than on the demonstration of stones or tumors, the possibility of inaccuracy was considerably greater. The most unsatisfactory diagnosis was "poorly functioning gallbladder." Such a diagnosis was made when the density of the shadow of the gallbladder was greater than that of the liver but the concentration of the medium was not sufficient for the examiner to delineate any radiolucent stones which may have been present. In the 1950 series, 22 such diagnoses were made with 2 errors (9.1 per cent). With the introduction of teridax in 1955, the percentage of gallbladders exhibiting some degree of function increased from 65.9 per cent in 1950 to 72.1 per cent of the total cases. As a result of the use of this new medium, no diagnoses of "poorly functioning gallbladder" were made in 1955.

A diseased gallbladder may maintain its function sufficiently to produce a normal shadow. In 1950 it was found that 6.2 per cent of 260 so-called normally functioning gallbladders showed definite pathologic alteration. In 1955 this figure was 5.2 per cent of 308 cases. More than half of the abnormal gallbladders were found to contain stones, whereas the remainder exhibited various degrees of inflammation in their walls. The authors believe that those cases which exhibit inflammation but function normally will always represent an unavoidable diagnostic error. However, they are not as willing to accept the inevitability of error when stones are present.

Three per cent of all nonfunctioning gallbladders were found to be normal. With a few exceptions there was no discoverable explanation for the failure of the gallbladder to concentrate the medium. Two or three per cent of all nonfunctioning gallbladders will prob-

ably continue to be erroneously diagnosed by the radiologist. No correlation was found between such factors as the patient's age, sex, height and weight, or the presence of jaundice, stones in the common duct, or other intra-abdominal pathologic findings, and the occurrence of errors in cholecystographic diagnosis. Any slight improvement in the accuracy as compared with that of Kirklin in 1933 is thought to be due to continuing improvement in the technical conduct of the examination and the extensive use of the right lateral decubitus view. No effect on the diagnostic accuracy was noted in the change from the use of priodax to the denser teridax. The percentage of normal gallbladders in the nonfunctioning group was practically identical with each of these two media. It is also important that the diagnostic accuracy in the group of normally functioning gallbladders did not change with the use of the denser medium. The availability of a more densely opaque gallbladder shadow is of great value to the technician in the making of cholecystograms. —*Harvey N. Lippman, M.D.*

An Evaluation of Biopsy-Frozen Section of the Ampullary Region and Pancreas; A Report of 68 Consecutive Patients. HARRAN J. SPJUT and AUGUSTO J. RAMOS. *Philippine J. Cancer*, 1957, 1: 308.

THE AUTHORS report the results of biopsy-frozen section of the pancreas and adjacent region in 68 patients. A total of 124 biopsies were performed. The authors recall the theses which have been discussed in the past concerning the value of frozen section of the pancreas. Other workers, they state, have contended that biopsy is dangerous, and that diagnosis from a frozen section is uncertain and even misleading. Because operative maneuvers in this area are relatively difficult and associated with fairly high mortality and morbidity, certainty of diagnosis is of importance.

Of the 68 patients, 49 had cancer and 19 had benign lesions. The majority of the malignant tumors were carcinomas of the head of the pancreas (36). A variety of benign lesions were found, including chronic inflammation and fibrosis, pseudocysts, and abscesses. The accuracy of frozen section was stated to be 91 per cent. All frozen section tissues were subsequently mounted as permanent sections.

Several reasons have been advanced against biopsy-frozen section: (1) bleeding, (2) acute pancreatitis, (3) pancreatic fistulas, and (4) the possibility of implantation of cancer. Of this group of patients, complications developed in 3. Pancreatitis was not encountered. In one patient a fistula developed, and in 2 others abscess formation took place after operation. Six false negative results were recorded in patients with neoplasm. Uncertainty of diagnosis necessitated six separate biopsies in one case. Two valid objections to biopsy can be raised, according to the authors: (1) it prolongs the operative procedure and (2) the tissue is difficult to interpret. For the sake of diagnostic accuracy these objections cannot be sustained.

Complete evaluation of the lesion is dependent on the locality from which the biopsy is taken; therefore, multiple biopsies seem justified when there is a strong suspicion of neoplasm.

Follow-up was accomplished in 17 of 19 patients with a diagnosis of "no cancer." Three of this group were subsequently proved to have had carcinoma. The authors conclude that biopsy-frozen section of the pancreas and adjacent tissues is fairly safe, and is a useful procedure. —*R. L. Lawton, M.D.*

The Technique of Pancreatojejunostomy Following Resection of the Tail of the Pancreas for Chronic Pancreatitis (Technique de la pancréato-jéjunostomie après pancréatectomie gauche pour pancréatite chronique). LUCIEN LEGER. *J. chir.*, Par., 1958, 76: 93.

CUTTING THE SPHINCTER OF ODDI has often proved to be disappointing in chronic pancreatitis because the difficulty may not have been in the sphincter. The pancreatojejunostomy of Du Val (with Roux Y principle) is more reliable. The authors present their experience with this technique.

An upper midline incision is used. Following examination of the upper abdominal organs the pancreas is investigated, with mobilization, if need be, of the duodenum. Characteristic of the disease is the stony hardness and fixation of the body of the pancreas.

The pancreas is exposed through the lesser omentum. A biopsy may be taken and an attempt is made to aspirate the duct of Wirsung; if pancreatic juice can be aspirated, an opaque medium is injected into the duct and a roentgenogram is taken. One looks for dilatation of the duct and the presence of the injected material in the duodenum.

If the surgeon is satisfied with the diagnosis, the gastrocolic ligament is divided transversely all the way to the hilum of the spleen. The latter is mobilized with section of the vasa brevia and brought out into the wound; posterior mobilization of the tail of the

FIG. 1 (Leger).

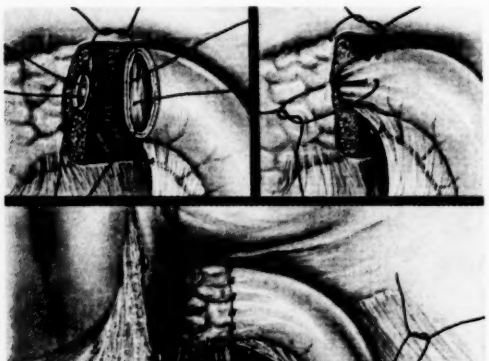


FIG. 2.

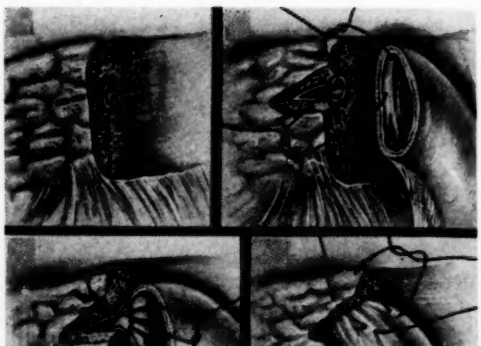


FIG. 3.

pancreas to the midline is necessary. The pancreas is now divided to the left of the midline.

Ordinarily, the duct of Wirsung is easily recognizable. Occasionally one has to explore small lumina with a probe. Often it is advisable to transect the pancreas still closer to the midline because the first line of section could have been through a stenotic portion of the duct. Any stones that can be felt are removed.

A polyethylene tube is inserted into the duct and, following instillation of an opaque medium, a roentgenogram is taken. Even with a duct of normal size at the line of division, a cystic dilatation may be thus visualized in the head. If pancreatography is normal, the operation does not proceed any further.

If there is evidence of proximal obstruction, a loop of jejunum is prepared for Roux Y anastomosis (Fig. 1). If the duct is large enough, a mucosa-to-mucosa anastomosis is done with a second seroserous layer of sutures (Fig. 2). The caliber of the duct may be enlarged by an anteriorly placed longitudinal incision 1 cm. long (Fig. 3). If the duct is not dilated, only seroserous layers are used for pancreatojejunostomy.

A Penrose drain is inserted to the anastomosis.

—*Leonid S. Cherney, M.D.*

Acute Pancreatic Necrosis; A Clinical and Pathologic Study of the Factors Affecting Mortality. ANDREAS D. DEMETRIADES and SILIK H. POLAYES. *Am. J. Digest. Dis.*, 1958, 3: 427.

THE AUTHORS report on a 10 year period from 1946 to 1955 in which the diagnosis of pancreatitis was made in 124 cases. Seventy-four per cent of these patients had a mild interstitial pancreatitis, and 26 per cent had acute pancreatic necrosis. Postmortem material from 19 cases was available for study. Of the 32 patients with acute pancreatic necrosis, 25 were admitted to the hospital and 7 of them were dead upon arrival.

Most of the patients were from a poor economic level and 65 per cent of them drank to an excess. In most instances the initial attack appeared to be precipitated by alcoholic excess. The predominant symptom was that of severe abdominal pain which was present in 84 per cent of cases. Jaundice was present in only 6 cases. Elevation of temperature and rapid pulse rate were present in one-half the cases studied. The majority had abdominal rigidity with rebound tenderness.

Glycosuria was present in 11 of 20 patients, only one of whom was a known diabetic. The white blood count was significantly elevated in 15 of the 20; the serum amylase was within normal limits in 10. In 3, aspiration of the peritoneal cavity was done and serosanguineous fluid was found with a high amylase level. The fasting blood sugar was elevated in 9 patients, and 7 of them with blood sugars over 180 mgm. per cent died. A greatly elevated blood sugar was considered indicative of a poor prognosis.

The roentgenograms most commonly revealed paralytic ileus, small-bowel obstruction, or enlargement of the head of the pancreas. The incidence of biliary disease was low and gallstones were found in only a limited number of cases.

The treatment was nonsurgical in 11 cases and included suppression of pancreatic function by suction and administration of a cholinergic drug, narcotics, treatment of shock, and use of antibiotics. Cortisone was not given to any of the patients. Surgical treatment consisted of exploratory laparotomy in 14 patients; 6 of them died within 6 days following surgery, with shock being the most common cause of death.

Pathologic study revealed necrosis of the gland in 13 cases and a hemorrhagic pancreas in 8. There was no evidence of abscess formation. In those patients who died suddenly, the pancreas was almost completely destroyed. The findings in the liver included fatty metamorphosis, cirrhosis, and focal hepatitis. The incidence of gallbladder problems was low and

was found in only 22 per cent of the fatal cases. The over-all mortality rate in those patients with acute pancreatic necrosis was 62.5 per cent.

In 3 patients, electrocardiographic evidence was found consistent with coronary artery disease. These patients all succumbed and autopsy revealed normal coronary arteries and myocardium.

—*W. Harrison Mehn, M.D.*

Clinical and Surgical Aspects of Pancreatic Pseudocyst. JOHN M. WAUGH and THOMAS E. LYNN. *Arch. Surg.*, 1958, 77: 47.

A GENERAL historical background of the surgical aspects of pancreatic pseudocyst is presented. In an attempt to evaluate further the operative results in the management of pancreatic pseudocysts, 58 cases encountered at the Mayo Clinic from 1948 through 1954 are analyzed.

In this series of 58 cases there were 35 men and 23 women. Forty-eight of the patients were between 30 and 60 years of age. Thirty-seven patients presented histories compatible with recurrent episodes of acute pancreatitis. Twelve were found to have pathologic conditions of the biliary tract at the time of operation. Eleven patients gave histories of prolonged excessive intake of alcohol. Six patients related the onset of their symptoms to an episode of severe trauma to the abdomen. There was nothing in the histories of 3 patients to suggest an apparent cause for the development of a pancreatic pseudocyst. Pain is the most common symptom of pancreatic pseudocyst. Fifty-two patients complained of pain. Among the 6 patients who did not have pain, 5 had a palpable mass in the upper part of the abdomen and one had jaundice as the prominent clinical feature.

Of the 58 patients, 35 had a palpable mass at the time of examination. The mass, when present, was found in the upper part of the abdomen. Twelve patients were found to have diabetes. Blood amylase was above normal in 12 of the 40 cases in which it was determined. When extensive destructive changes have occurred in the pancreas, values for the enzymes may not be elevated even during acute attacks. Nine patients had roentgenographic evidence of calcification in the region of the pancreas. Other roentgenographic findings include widened duodenal C-loop and distortion or indentation of the stomach and/or colon.

The absence of an epithelial lining differentiates a pseudocyst from a true cyst of the pancreas. The pseudocyst has a fibrous tissue wall, which may vary in thickness from one to several millimeters. It is frequently adherent to surrounding structures. The size of the pseudocyst may vary from several to 25 cm. or more in diameter. Rarely is the cyst multilocular.

The optimal operative approach to a suspected pancreatic cyst will depend largely on the size and location of the mass. A transverse incision placed over the pancreas affords the best exposure of the entire gland. A variety of procedures were employed in the 58 cases. The procedures included:

Incision and Drainage. Follow-up information was available in 20 of the 23 cases in which this was done. The duration of drainage varied from 6 weeks to 2.5 years, with a mean time of approximately 6 months. In 2 patients the cyst was recurrent; it is noteworthy that the length of previous drainage had been less than a month in each instance. Lesions were encountered in the biliary tract of 7 patients in this group.

Incision and Marsupialization. Seventeen patients had this procedure and follow-up information was available in each case. The average duration of postoperative drainage was approximately 7 months. Only one patient had a recurrence of the cyst. In general, marsupialization was employed for somewhat larger cysts than those in which simple drainage was instituted. Four of these patients had lesions in the biliary tract. The findings and results in these first two procedures would support the conclusion that external drainage gives satisfactory results if it is adequate and if it is maintained for a sufficient time.

Excision. Follow-up information was available on all 9 patients who had undergone excision of a pseudocyst. In 5 patients a portion of the pancreas was resected with the pseudocyst. The cysts of 4 patients were excised. There were no recurrences in this entire group. Total excision of the cyst is usually not feasible because of its adherence to surrounding structures and to the pancreas itself.

Internal Drainage. Eight patients had internal drainage of a pancreatic pseudocyst: duodenal in 2, jejunal in 3, and stomach in 2. Follow-up data were available on 7 of these patients. In no patient in this group was there evidence of recurrence of the cyst.

Evacuation. In 2 patients other major surgical procedures negated a definitive procedure, and the cyst was simply evacuated. In neither instance—one that of a 300 c.c. cyst in the tail and the other that of a 100 c.c. cyst in the head of the pancreas—was there evidence of recurrence subsequently.

In summary, the authors believe that external drainage is the treatment of choice in the majority of cases. Recurrence of the cyst can be prevented by drainage for an adequate period.

—*Arthur M. Simpson, M.D.*

The Choice of Surgical Procedures in the Treatment of Pancreatic Cysts. KENNETH W. WARREN and AUGUSTUS L. BAKER, JR. *Surg. Clin. N. America*, 1958, June, p. 815.

THE GREAT VARIETY in the etiology and pathology, and the size, shape, and anatomical relationships of pancreatic cysts suggests that no one surgical procedure can be considered the best form of treatment.

Cysts of developmental origin presumably arise from faulty fusion of ductal elements. Most pancreatic cysts are of inflammatory origin. These may be pseudocysts with walls consisting of adjacent organs, or may be actual retention cysts. Either type of cyst may be seen in patients with chronic relapsing pancreatitis.

Infrequently, either blunt or penetrating trauma may be a cause of pancreatic cysts. They may occur after relatively trivial injury, and there may be a few days to several months delay between the injury and the appearance of a cyst.

Cysts may be neoplastic in origin, a high percentage being malignant. There may be much fluid and little solid tissue, so that the neoplastic nature of the cyst may not be realized and improper management may result. In the absence of a history of trauma or inflam-

mation, neoplasia should be considered as a possible cause of pancreatic cyst.

The first sign of congenital or neoplastic cysts is frequently a palpable mass. More severe symptoms are present with cysts of traumatic origin, such as pain, indigestion, chills, and fever. Diagnosis can usually be made preoperatively if the possibility of such a cyst is kept in mind. A barium meal will often indicate the size and location of the cyst by visualizing the distorted stomach.

Five types of surgical treatment are available:

1. Simple drainage is an effective method of managing a pancreatic cyst, particularly in those of traumatic or inflammatory origin in which resection or excision is not feasible. The most accessible portion of the cyst is exposed, the cyst emptied by trocar aspiration, and an incision made to inspect the inner surface. A de Pezzer catheter is then sutured into the cyst and brought through the anterior abdominal wall lateral to the incision.

2. Internal drainage is gaining in popularity but its use should be restricted, for it may deny a patient with a malignant cyst the opportunity for cure. Complications from this treatment can be severe. Recurrences are not uncommon.

3. Excision is especially applicable to a large retention cyst of the pancreas without trauma or significant inflammation. Every effort should be made to excise such cysts. Surprisingly large cysts can sometimes be completely excised, and complete cure results.

4. Resection of the tail or tail and body of the pancreas is an effective method of treatment for cysts in these locations. The spleen is usually mobilized with the pancreas and also removed.

5. Pancreatoduodenal resection is a radical procedure, never employed as a primary measure, but occasionally utilized in complicated recurrent cases with chronic relapsing pancreatitis.

Of 120 patients undergoing surgery for pancreatic cysts, approximately half had pseudocysts. Of the pseudocysts, 57 were inflammatory and 8 of traumatic origin. There were 36 retention cysts and 9 cystadenocarcinomas. The many different procedures used in the entire series are tabulated. The mortality rate was 1.6 per cent. —*Stanley W. Tuell, M.D.*

Splenectomy in the Treatment of Cooley's Anemia. (Text in Greek). G. N. Marangos. *Helliniki Iatriki*, 1957, 26B: 481.

The author reports his experience with splenectomy for Cooley's anemia from the Nicosia General Hospital in Cyprus. He performed splenectomies with no mortality in 36 of a total of 67 cases of Cooley's anemia admitted to his service.

All of the patients were carefully prepared preoperatively and most of them received multiple transfusions. All the removed spleens were enlarged, their weights ranging between 600 and 2,500 grams. In few cases ascites was present. During splenectomy accessory spleens were looked for and were found in the majority of cases. The postoperative results were generally very good for the first 6 months. Afterward, only a few patients remained completely asymptomatic, while the majority still had anemia, less severe than before the operation.

The author believes that splenectomy has a place for selected cases of Cooley's anemia, and in the absence of any other more effective treatment it is worthy of trial. None of his patients' conditions were worse after splenectomy.

—*Michael G. Seremetis, M.D.*

MISCELLANEOUS

Significance of Fluid Levels in X-Ray Films of the Abdomen. John K. Donahue, Charles Hunter, and Henry H. Balch. *N. England J. M.*, 1958, 259: 13.

The appearance of fluid levels in the intestine on a roentgenogram of the abdomen is regarded as pathognomonic of intestinal obstruction by many surgeons and radiologists. This sign was described by Schwartz in 1911 and corroborated by Assmann in 1913. The authors present a case of a 29 year old man who was admitted to the Emergency Room because of severe cramping abdominal pain which had begun 24 hours previously. After the onset of his abdominal discomfort, he ingested two doses of Epsom salts. On examination, there were moderate abdominal distention and high-pitched bowel sounds and roentgenograms revealed gas in the small and large bowel and the presence of fluid levels.

Stimulated by this case, the authors attempted to produce fluid levels in the intestine in the absence of mechanical or paralytic obstruction. They studied 23 young female adults. Each patient was given 30 to 40 gm. of magnesium sulfate orally. The patients were told to expect some abdominal discomfort and were asked to notify the observer of the exact time at which this occurred. Approximately 40 minutes after the appearance of the abdominal signs, roentgenograms of the abdomen were again taken with the patients in the supine and upright positions. Fluid levels were seen in the upright view after the ingestion of magnesium sulfate in all 23 patients studied. The average time of their appearance was 110 minutes. The authors point out that fluid levels are seen in patients who have been given morphine or iodopyracet. They believe that mobilization of fluid into the intestinal lumen, together with the air swallowing which accompanies nausea, produces a set of circumstances likely to give rise to fluid levels on the roentgenogram. A carefully taken history of possible ingestion of irritants or cathartics before roentgenographic examination of the abdomen may aid in the interpretation of radiographic signs suggesting bowel obstruction.

—*Alan Thal, M.D.*

GYNECOLOGY

UTERUS

Condylomata Acuminata of the Cervix. J. Donald Woodruff and William F. Peterson. *Am. J. Obst.*, 1958, 75: 1354.

Thirty-nine cases of condylomata acuminata of the cervix were studied in the Johns Hopkins Department of Gynecology. Microscopic criteria for the diagnosis of this lesion and differences between condyloma and squamous papilloma are suggested. Although there is a degree of overlapping of certain features, nevertheless, the major characteristics of condylomata are primarily parakeratosis and acanthosis with elongation and thickening of the rete pegs. Minor degrees of papillomatosis and vacuolization of the cells were frequently seen but were of secondary importance diagnostically.

Malignant change is a rare finding in condylomata, although confusing pictures are seen.

—*Alan Rubin, M.D.*

Contribution to the Study of Cystic Tumors of the Uterus (Contributo allo studio dei tumori cistici dell'utero). Carlo Ferraro. *Q. clin. ostet. gin.*, 1958, 13: 75.

After a brief review of the literature the author reports a case of cyst of the uterus with illustrations of the histological features. He discusses the etiology and the difficulties of making the right diagnosis at laparotomy.

The patient was a 42 year old woman who was admitted because of irregular periods. Examination revealed a uterus the size of a 4 months' pregnancy. At laparotomy a diagnostic puncture was made and clear fluid aspirated. Then an incision was made in the wall of the uterus and a large submucous cyst was found. Hysterectomy was performed. The author believes this cyst originated in a degenerated submucous fibroid tumor. —*Alexander J. Conte, M.D.*

A Tampon Smear Method in Cytological Diagnosis (Ueber eine Tamponausstrichmethode in der zytologischen Diagnostik). K. Tietze. *Geburtsh. & Frauenh.*, 1958, 18: 746.

The author gives an account of a new tampon smear method for the diagnosis of female genital cancer. The tampon eases the work of the busy specialist and country practitioner.

The tampon is prepared by impregnation with thyrofusin-K solution (isotonic saline) and is dry-air sterilized together with a special glass container. The thyrofusin-K facilitates the transfer of the cells from the cervix to the tampon.

The physician fills out a short query sheet, which he gives to the patient. The doctor inserts the described tampon in the vagina as close as possible to the portio and instructs the patient to remove it by the handle after 12 to 24 hours. After removal, the patient places the tampon in the container and mails it to the nearest hospital. The material reaches the hospital laboratory no later than 48 hours after mailing. In 211 examinations there was no diagnostic error. —*George J. Silló, M.D.*

Cytodiagnosis in Cancer of the Cervix. J. H. Cutts. *Canad. M. Ass. J.*, 1958, 78: 825.

A 4 year survey of the material received at the Pathological Institute, Halifax, Nova Scotia, for cytologic diagnosis of cancer of the cervix is presented.

While the error for positive smears was less than 10 per cent, the over-all error for positive, doubtful, and suspicious smears was 22 per cent, and for this reason every positive or suspicious diagnosis should be confirmed by histologic study of biopsy specimens.

False diagnosis arises either from faulty sampling or from difficulty in interpretation of the microscopic findings. The latter generally produces a false positive or suspicious report.

The diagnostic features of cells are referable only to the nucleus. Cytoplasmic changes are ill-defined and common to all the cells studied, regardless of their type. The features found to be of most value, in order of merit, are: (a) an increased nuclear/cytoplasmic ratio; (b) condensation and wrinkling of the nuclear membranes; (c) increased chromatin staining and alteration of the chromatin pattern to a coarsely granular type; (d) the presence of macronucleoli; and (e) variation in size and shape of the nuclei.

Cells which are the morphologic equivalent of cancer cells appear to be formed in the cervix at least at some time during the life of many patients in whom cancer cannot be demonstrated. Cytologic diagnosis is possible only because in cancer many such cells are seen in the smear. The findings suggest that cancer proceeds in steplike deviations from normal, and that only in a small number of cases does the process reach full fruition. —*John R. Wolff, M.D.*

Simultaneous Colposcopy and Cytology Used in Screening for Carcinoma of the Cervix. E. Navratil, E. Burghardt, F. Bajardi, and W. Nash. *Am. J. Obst.*, 1958, 75: 1292.

Preclinical carcinoma of the cervix was diagnosed in 306 of 18,112 patients. The first vaginal smear was positive in 88.5 per cent of these cases. In 26 instances (8.5 per cent) in which the smear was negative, colposcopic examination was positive. However, there were 51 cases (16.6 per cent) in which the smear was positive and colposcopy was negative. Both smear and colposcopy were negative in 4 (1.3 per cent). Colposcopy combined with cytologic examination appears to increase the likelihood of diagnosing preclinical carcinoma of the cervix. —*Alan Rubin, M.D.*

Early Histologic Diagnosis of Cancer of the Uterine Cervix (Diagnostico histologico precoz del cancer del cuello uterino). Francisco Nogales. *Toko-gin. prat.*, 1958, 17: 184.

The only way to combat cancer of the uterine cervix is to diagnose it in the initial stages of its development.

Once it becomes invasive, the mortality rate is 60 per cent. For this reason it is imperative to make the diagnosis at a time when the neoplastic process is localized in the epithelium and has not yet penetrated to the connective tissue which is abundantly supplied with lymphatics. Studies on the histopathology of tuberculosis of the cervix showed the effect of the chronic tuberculous irritative stimulus of the substrate on the cylindrical and pavement epithelia. The cylindrical epithelium suffers functional alterations or modifications as well as morphologic changes, such as vacuolization, pyknosis, and regressive atypical phenomena, also disturbances in the chromatin structure of the nuclei and phenomena of indirect pavement metaplasia, atypical cells and nuclei, increased mitosis of the cells, and in one case malignant metaplastic transformation of the cylindrical epithelium into cancer of the cervix. In the same biopsy the phases of transition of the normal glandular epithelium to malignant metaplasia may be visualized. Histochemical studies have helped to clarify the mistaken conceptions of epidermization in the cervix. In the ectocervix there is a superficial layer of mucification, an intermediate layer containing glycogen which is digested by amylase, and a third basal layer deprived of polysaccharides and rich in nucleinic acids. Only the endocervical cylindrical epithelium contains mucin.

With this method it was discovered that certain epithelial changes and glandular epidermizations are of definite metaplastic origin from indirect metaplasia of the cells of replacement. Many epidermizations take place according to the classic mechanism described by R. Meyer, but if they are superimposed on a chronic inflammatory substrate or under certain hormonal conditions as in pregnancy, they have a metaplastic origin.

Early diagnosis of cancer of the cervix based on a subjective interpretation of the initial changes in the epithelium has resulted in the sacrifice of many uteri in the simple process of reparation. Only the pathologist will have sufficient experience to diagnose incipient tumors. The author proceeds to discuss the microscopic diagnosis and pathology of cancer "in situ." Left without treatment, it goes on to clinical cancer with invasion of the subjacent connective tissue and lymphatics, and with distant metastases.

Following a review of the literature concerning atypical or carcinomatous surface epithelium, the mistakes due to subjective interpretation of suspicious or precancerous lesions, and the need for great experience as well as a "few drops of interpretative intuition in the pathologist" (as recommended by Robert Meyer), the colposcopic appearance of precancerous lesions are described. Two types are distinguished: (1) simple atypical epithelium that only exceptionally goes on to carcinomatous transformation, and (2) highly atypical epithelium with leucoplasia, and invasion of the base and mosaic, and other special forms of atypical epithelium. The first lesion corresponds histologically to epidermization, and the second to surface carcinoma with hyperactive epithelium or suspicious epithelium.

The author attributes special importance to satellite inflammatory infiltration in the subjacent connective tissue in the atypical epithelium, with regard to eventual malignant transformation of the epithelium. He attributes this to chronic irritation leading to permanent metabolic changes in the substrate, vascularization, circulation, and oxygen supply, which alter the biology of the superposed epithelium. In some the rhythm of mitosis is disturbed, with leucoplasia or malignant differentiation (cancer in situ) in others. In the cases of tuberculosis followed by cancer, the transformation of cylindrical epithelium into true invasive squamous cancer was followed step by step. The microscopic findings in these tumors were the compact and cellular composition of the neoplastic epithelium, the disorder due to loss of typical stratification and polarity of the cells, the atypical character of the cells, the changes in the protoplasm-nucleus ratio in favor of the latter, the numerous typical or atypical mitotic figures, and the lack of involvement of the membrana propria of the connective tissue. If the cytomorphology corresponds to the preceding in general, a diagnosis of cancer in situ is justified even in the absence of mitoses. However, if anomalous mitoses are demonstrated, this would support a diagnosis of carcinoma. The presence of pathologic mitoses is not regarded as an absolute indication, but in doubtful cases a detailed investigation is imperative.

In the first cancers in situ diagnosed in these laboratories, a histologic detail was noted which had not hitherto been reported. The normal squamous epithelium was firmly attached to the basal membrane or membrana propria, while in cancer in situ, the tumor appeared to be detached from the basal membrane and the connective tissue appeared to be denuded, limited by the membrana propria, and infiltrated with inflammatory elements. This was evident in the paraffin sections. For this reason the study of cervical biopsies in paraffin sections should be made to avoid gross errors in diagnosis.

The findings of Hertig and Limburg concerning cancer in situ are reviewed. From their histochemical studies on cancer in situ, the author and Botella concluded that the demonstration of saccharides (glycogen and mucin) and other histochemical reactions, such as the estimation of alkaline glycerophosphates, metachromasia, and basophilia, will permit earlier and more exact diagnosis of cancer in situ and clarify some of the histogenetic details. The author believes that such studies have a great future in the problem of cervical cancer. —*Edith Schanche Moore.*

Hysterectomy for Benign and Malignant Disease; Analysis of 2,284 Consecutive Cases. GEORGE T. SCHNEIDER and JOHN C. WEED. *South. M. J.*, 1958, 51: 561.

A CAREFUL ANALYSIS was made of 2,284 consecutive hysterectomies performed for benign or malignant disease on private patients during the 10 year period ending in December, 1956. Total abdominal hysterectomy was performed 1,692 times, subtotal hysterectomy was performed 11 times, and the vaginal operation was used 581 times. Previous gynecological surgery which terminated the possibility of pregnancy had been performed on 28.7 per cent of the patients. This strikingly high percentage increasingly convinces the authors that incidental hysterectomy should be done whenever reproductive function is to be destroyed by

bilateral salpingo-oophorectomy, bilateral salpingectomy, or tubal ligation, and should be done at the time of any pelvic procedure in a woman at or near the menopause. Spinal anesthesia was used in more than 85 per cent of the cases. The mortality rate was 0.09 per cent and the two deaths occurred in patients with malignant disease. The morbidity rate was 21.5 per cent. Urinary infection was the primary cause of such morbidity. The incidence of malignant disease in their series was 10.2 per cent and, as was expected, the most common benign uterine lesions were leiomyomas and endometriosis. The authors state that the indications for hysterectomy may be easily classified into urgent, elective, and incidental. Urgent indications for hysterectomy include cancer, incapacitating pain, or dangerous hemorrhage. Elective operations include prolapse, endometriosis, fibrosis, or pelvic infection.

—*Thomas W. McElin, M.D.*

EXTERNAL GENITALIA

The Relationship of Chronic Vulvar Disease, Leucoplakia, and Carcinoma in Situ to Carcinoma of the Vulva. A. J. McAdams, Jr. and Robert W. Kistner. *Cancer*, 1958, 11: 740.

A GREAT DEAL of confusion and many conflicting viewpoints have arisen concerning vulvar lesions which are considered "precancerous." Much has been written on this subject both by dermatologists and gynecologists. Confusion arises mainly because of indefinite and inadequate terminology.

Using histologic criteria alone, the authors analyzed specimens from 397 patients with vulvar lesions. Included among the chronic dermatoses studied were neurodermatitis, chronic nonspecific dermatitis, lichen planus, psoriasis, and chronic lichenoid dermatitis. Although there are exceptions, it is demonstrated that the majority of vulvar cancers are not unlike those occurring in the skin of other body locations.

Thirty-two patients were considered to have leucoplakia on the basis of acanthosis, irregular rete pegs, and hyperkeratosis, plus cellular atypism and dyskeratosis. All had additional findings of one or another of the chronic dermatoses except for lichen planus. Follow-up data were available on 27 cases, 20 being followed up 3 or more years. Carcinoma appeared subsequently in 10 per cent, a figure comparable to the expectation of carcinoma in patients with senile keratoses. None of the patients with the various forms of chronic dermatosis, with or without dermal alterations, developed carcinoma. In analyzing the data on invasive squamous cell carcinoma of the vulva, it seemed that the cases also showing intraepithelial carcinoma had a more favorable prognosis.

—*Warren R. Lang, M.D.*

MISCELLANEOUS

Diagnosis of Intersexuality Occurring with Rudimentary and Hypoplastic Gonads (Zur problematik der Zwitter mit rudimentaeren und hochgradig hypoplastischen Gonaden). E. Philipp and H. H. Stange. *Geburtsh. & Frauenh.*, 1958, 18: 703.

Five cases of gonadal dysgenesis and intersexual external genitals were described in detail. Two of them were cases of Turner's syndrome. In this syndrome the body type is almost always feminine, accompanied by infantile female external genitalia, but the clitoris is hypertrophic. Upon investigation of the ketosteroid levels nothing significant was found, since the levels were well within normal range.

The adenomatous hyperplasia of the hilus cells was quite remarkable. After extirpation of the hilus cell tumor and subsequent microscopic examination, the picture of regressing virilism was seen. Quite often, signs of virilism are observed in cases of Turner's syndrome. This has been explained on the basis of the androgen-estrogen imbalance, coupled with the susceptibility of the end organ to these differing stimuli. It was thought to be best to remove these rudimentary gonads because of the presence of tumor cells.

Two cases of intersex were also discussed. One of these patients had bilateral ovotestes. The ovarian part of this structure was not as well developed as the testicular part, but there were no signs of spermatogenesis. Increased gonadotropic secretion in the other patient who had two gonads differentiated into the opposite sex (hermaphroditismus verus unilateralis) did not result in either abnormal ketosteroid or abnormal corticosteroid levels.

The fifth patient was a male pseudohermaphrodite with intersexual external genital organs. There was unilateral testicular dysgenesis; however, this condition was not indicated by any major physical signs. There was possibly unilateral testicular formation present. The poorly developed testis on the other side was unable to induce the development of the male seminal ducts. However, it must be noted that the müllerian ducts were well developed on that side. On the other side exactly the opposite picture of development was found. There was a well formed uterine horn with a rudimentary tube; the seminal ducts were poorly differentiated.

In the final analysis, it must be stated that no definite conclusion can be drawn from the findings of the two cases of true hermaphroditism, either with regard to the etiology or the pathogenesis of the double sex. Only recently in England it has been said that hormone therapy during pregnancy may increase the chances of formation of individuals with indefinite sexual characteristics because of the disturbance of the in utero androgen-estrogen balance. Much further investigation is needed in this field.

—*Sylvain Van de Rijn, M.D.*

The Treatment of Vesicovaginal Fistula (Beitrag zur Behandlung der Blasenscheidenfistel). Josef Péč. *Zschr. Urol.*, 1958, 51: 236.

After the somewhat surprising introductory statement that vesicovaginal fistulas are a frequent complication of gynecologic surgery in the author's geographical area, he presents a method whereby 6 vesicovaginal fistulas were closed with a single operation in his clinic. He describes a two stage operation in which the first stage consists of the construction of vaginal flaps. These flaps are utilized to reduce the size of particularly large fistulas so that at the time of the second operation only a relatively small opening remains to be closed. The specific technique of secondary closure recommended by the author fol-

lows the method of Bedrna in which a purse string suture is placed about the fistulous opening after freshening of the edges. Next, any intervening fascial tissue between the bladder and vagina is closed with mattress sutures and lastly, the vaginal mucosal closure is performed. The author utilizes all of the standard preoperative and postoperative techniques of investigation and of maintenance that have been suggested by others. A particularly fascinating case report is included in which a large vesicovaginal fistula was produced in a psychotic patient by self-introduction of a spool of thread into the bladder. Multiple vesical calculi were formed and in the course of removal of the spool and of the stones, a large fistula resulted. Successful closure of this 5 cm. defect was achieved by the author's method.

—*Thomas W. McElin, M.D.*

Experience with the Surgical Treatment of Vesicovaginal Fistula (Erfahrungen mit der Operation der Blasenscheidenfistel). AUREL NOSZKAY. *Zschr. Urol.*, 1958, 51: 206.

IN THE COURSE of 14 years, 40 patients with fistulas were treated in the author's clinic. Thirty-seven of the fistulas were closed with a single operation, 1 fistula was closed with 2 operations, and one fistula closed with conservative management. Of the 40 fistulas 39 were therefore closed and 1 fistula was still unclosed after a second operation. The vaginal approach was used 37 times, the transvesical approach twice and, in the two instances, anastomosis between the ureter and the bowel was utilized. The primary point to be made from this article is that the method of closure per vagina followed the technique of Füth plus the utilization of the bulbocavernosus muscle as suggested by Martius. The author emphasizes a waiting period of 3 to 6 months before attempting to repair any fistula and he insists on closure of the fistula without tension. He believes that the support which is offered by the interposed bulbocavernosus muscle eases the tension on the suture line.

—*Thomas W. McElin, M.D.*

Hemolytic Anemia Associated with Dermoid Cyst (Die haemolytische Anaemie als Begleiterkrankung bei Dermoidzysten). W. MÜLLER, H. SCHUBOTHE, and R. ELERT. *Geburtsh. & Frauenh.*, 1958, 18: 723.

AFTER a review of the literature the authors cite 7 cases of dermoid cyst with autoimmune hemolytic anemia. They report in detail the case of a 44 year old woman, who was treated unsuccessfully by medical (large doses of cortisone and ACTH) and surgical treatment 1.5 years ago. Gynecologic examination revealed, on the left side, a large, fistlike, mobile ovarian cyst. The lack of response to the aforementioned treatment and further laboratory findings suggested an autoimmune hemolytic anemia with the cyst as antigen.

At operation they found a dermoid cyst, a fibroid uterus, and endometriosis of the right ovary. Therefore a total removal of the uterus and adnexa was performed. The hemolysis stopped 14 days after operation, and after 4.5 months there were few residual signs. Two years later the blood was normal except for the positive anti-D reaction.

The authors conclude that the cysts themselves produce little or no antibodies, but that they have antigens (lipoid and egg white) which stimulate the system generally. The authors recommend gynecologic examination in all cases of acquired hemolytic anemia and removal of any ovarian cysts.

—*George J. Sillő, M.D.*

Recent Clinical Experiences with Carcinoma in Situ (Neue klinische Erfahrungen beim Oberflaechenkarzinom). G. F. WINTER. *Geburtsh. & Frauenh.*, 1958, 18: 484.

THE QUESTION of whether or not carcinoma in situ is a true cancer has yet to be solved. However, there are three points that bear mentioning in this regard.

In the first place there is an apparent increase in the over-all incidence of carcinoma in situ. The increase is apparent in spite of the diversity of views on what constitutes carcinoma in situ; it is probably due to the different criteria accepted by different workers. The increase has been reported by several authors and in the Women's Clinic of Berlin there has been a rise from 4.3 per cent of all carcinomas in 1954 to 10.4 per cent in 1956. The reasons for this probably rest on the use of cytology in the last decade, the more intensive utilization of colposcopy, the institution of cancer detection clinics, and the more widespread instruction of practicing gynecologists in the techniques of cytology and colposcopy.

Secondly, there have been many reports of original diagnoses of carcinoma in situ which, on further sectioning, further biopsy, or removal of the entire cervix, have been modified to invasive carcinoma. An excision biopsy must therefore be considered unreliable. For precise diagnosis, either a coning biopsy with fractional curettage or an extensive conical biopsy should be performed.

Finally, to avoid misleading information on the frequency of carcinoma in situ, the author suggests the following classification:

Group 1. Carcinoma Stage 0 (in situ carcinoma) partialis. Specimens are obtained by excision or scraping biopsy or by curettage.

Group 2. Carcinoma Stage 0 totalis. Specimens are obtained either by extensive conical biopsy or by examination of the removed cervix. Only this group of cases is reliable for the diagnosis of carcinoma in situ.

—*Warren R. Lang, M.D.*

A Unified Approach to the Classification of Carcinoma of the Genital Tract (Vorschlag zur Vereinheitlichung der Stadieneinteilung bei den Genitalkarzinomen). J. BREITNER. *Geburtsh. & Frauenh.*, 1958, 18: 499.

THE AUTHOR believes that a unified method of classification for all genital tract carcinoma would be of value. The classification of stages of cervical carcinoma is fairly well standardized, but this is not true of other types of carcinoma. He prefers not to speak of a Stage 0 carcinoma at all since this type should be 100 per cent "curable." Nonmalignant atypical epithelial changes are not to be included.

The preferred method of classifying corpus carcinoma is that of Bickenbach. The division into stages of ovarian carcinoma is a problem; however, any

TABLE I.—CLASSIFICATION OF CARCINOMA OF THE GENITAL TRACT

	Stage 1	*Stage 2*	*Stage 3*	*Stage 4*
	Limited to involved organ	Spread to nearby tissue	Within minor pelvis but not bladder or rectum	Bladder, rectum, beyond minor pelvis, metastases
Cervical carcinoma (International Classification)	Portio	Parametrium nearby, vagina, corpus	Parametrium to pelvic wall	Beyond minor pelvis, bladder, rectum, metastases
Corpus carcinoma (according to Bickenbach)	Corpus	Cervix	Into small pelvis	Beyond minor pelvis, vulva, bladder, intestines, metastases
Vulvar carcinoma (according to Huber)	Tumor less than 2 cm. in diameter	Vulva (but not lymph nodes)	Regional lymph nodes	Vagina, intestines, rectum, bones, metastases
Ovarian carcinoma	Ovary	Tube, corpus	Lymph nodes, into minor pelvis	Beyond minor pelvis, bladder, intestines, metastases

classification of it must be based upon laparotomy findings and this gives more accurate results than is usual with cervical carcinoma.

The author's suggested classification is shown in Table I. Vaginal carcinoma and carcinoma of the cervical stump are classified as cervical carcinoma, tubal carcinoma as ovarian carcinoma.

—*Warren R. Lang, M.D.*

Vasopressin as a Hemostatic in Gynecologic Surgery. THOMAS F. DILLON, BENJAMIN E. MARBURY, ROY W. BONSNES, R. GORDON DOUGLAS, and VINCENT DU VIGNEAUD. *Obst. Gyn.*, 1958, 11: 363.

HEMOSTASIS in conservative uterine operations, such as myomectomy, in unification procedures, and in certain vaginal operations, continues to be a significant problem in gynecologic surgery. Not only does the surgeon operate in a highly vascular field without precise hemostatic control, but also he must preserve the vascularity of the organ to insure success. Rubber-shod clamps on uterine and ovarian vessels, tourniquets, and the local intrauterine injection of posterior pituitary hormone preparations have been used to overcome the problem. In their Departments of Obstetrics and Gynecology, Anesthesiology, and Biochemistry, at the Cornell University Medical College and the New York Hospital (the New York Lying-In Hospital), New York City, mechanical methods for the control of bleeding have not met with complete acceptance. Hormonal hemostasis too has been largely abandoned because of the potential hazards of the preparations heretofore available, although this method seemed to them to be preferable.

The recent isolation and synthesis of purified posterior pituitary hormones suggested, however, that the utilization of these hormones in place of the available preparations might eliminate the undesirable complications and efficiently effect hemostasis. It is the purpose of this survey to present a preliminary report on the use of one of these purified posterior pituitary hormones, vasopressin, as a hemostatic agent for those procedures in the above categories wherein blood loss is anticipated or becomes a problem.

Prior to the isolation of the purified compounds the preparations commercially available were either extracts of the posterior pituitary gland containing all the extractable activities, e.g., pituitrin, or preparations in which the physiologic activities of the whole-gland extract were largely separated into two fractions, e.g., pitressin and pitocin.

Specifically, it has been documented that pitressin has decidedly untoward effects on the heart, the principal one of which is coronary constriction. Because of this influence documented with parenterally administered pitressin, plus the known cardiocirculatory effects of certain anesthetic agents, posterior pituitary preparations have fallen into disuse during gynecologic operations. But, to the best of the authors' knowledge, no catastrophes have occurred following the direct injection of pituitary extracts into the nonpregnant uterus during such procedures.

In recent years du Vigneaud and associates have isolated two compounds from posterior pituitary extracts, determined their structure, and proved the structure by synthesis. These compounds are known as vasopressin and oxytocin.

Oxytocin carries most of the oxytocic activities of the posterior pituitary extracts and pitocin. It accounts for the oxytocic effect in the pregnant uterus, milk-ejection activity, and does have some slight pressor-antidiuretic action that is relatively insignificant.

Vasopressin is largely responsible for the pressor-antidiuretic activities and is the compound which accounts for most of the physiologic activity of pitressin. "Arginine vasopressin" was used in this study. As stated, this hormone accounts for the pressor-antidiuretic activities, plus some slight oxytocic activity on the pregnant uterus. But more important is the contracting and vasoconstrictory influence exerted by vasopressin in the nonpregnant uterus. This "oxytocic activity" in the nonpregnant uterus, coupled with its local vasoconstrictor action, results in hemostasis of the uterus seemingly ideal for operative procedures.

With these facts before us the authors state that they began a study of the effects of vasopressin injected locally into the myometrium or cervix at the time of gynecologic surgery.

The criteria for selection of the initial patients were that they be normal, healthy subjects except for the uterine disease, between the ages of 20 and 30 years, and with normal cardiovascular systems. Each patient was evaluated preoperatively by careful history and physical examination, electrocardiogram, chest

x-ray, and consultation with a cardiologist. To date, 20 patients have met these criteria, and vasopressin was used in operating upon them. Seventeen patients served as concurrent controls.

The cardiovascular catastrophes previously reported occurred following the parenteral administration of pitressin in doses ranging from 10 to 15 units. In preliminary trial, 2 patients received 10 units of vasopressin injected locally into the uterus without untoward effect. Thereafter, 4 units were found satisfactory. Four units of the purified substance were then selected as the maximum dosage to be used routinely. To allow a large volume for fractional injection, the 4 units were diluted in 20 ml. of saline solution, resulting in a solution of 0.2 unit per ml. The solution was injected directly into the uterus with a 20 or 22 gauge needle. In myomas, the hormone was placed into the myometrium around the myomas or the bases of the pedicles. Pedunculated tumors need not be injected. In unification operations, the fractional injection of small amounts throughout the uterus is most important. In cervical procedures 2 or 2.5 ml. of the solution may be injected into the cervix at the 12, 3, 6, and 9 o'clock positions. The amount required in a given instance varies, but usually the initial administration is of the order of 1 to 2 units, i.e., 5 to 10 ml. of solution. If additional hemostasis is required and untoward reaction does not occur, injections may be repeated to the arbitrary total of 4 units.

A few seconds after the injection of the hormone the uterus may contract and/or blanch. The cut surface of the myometrium will reveal little or no bleeding, but it is important that any large arteries encountered should be ligated. The effect lasted for 15 to 20 minutes from the original administration in 19 of their patients, and the uterus then slowly returned to its normal pink color well in advance of abdominal closure.

The blood loss was measured by weighing sponges and gauze pads as they were used, a procedure that has been standardized in the operating rooms used by the authors for many years. The recorded loss accordingly includes all that is encountered during the procedure, from the skin incision to the completion of the closure.

In all instances in which vasopressin was used, the desired response was obtained. The total blood loss and the transfusion requirements, with their inherent dangers, were significantly lower in all vasopressin cases as compared with the control cases. In those control cases in which oxytocin or pitocin was used no similar hemostatic effect was noted. The blood loss was 100 to 500 c.c., an average of one transfusion, as compared to the blood loss of 250 to 2,500 c.c. with seven transfusions.

In the unification operation vasopressin was used in 3 cases; 2 control operations were performed.

The vasopressin exerted a profound influence. In each instance the uterus responded by contracting and blanching. When the organ was bisected virtually no bleeding was encountered, and the excision of the septum was carried out in a bloodless field.

In cervical conization cases the effect of vasopressin in the cervix is identical to that noted in the corpus of the uterus. In those patients receiving the hormone the blood loss was consistently minimal.

There were no untoward reactions attributable to vasopressin. There was no apparent disturbance of cardiac, circulatory, or renal function in those patients receiving vasopressin. The return of normal blood supply to the uterus was evident prior to abdominal closure in all instances.

Postoperative hemorrhage was not encountered.

Vasopressin is the purified posterior pituitary hormone that is free from other physiologically active and inactive compounds that are present in commercially prepared substances, such as pitressin. In addition to the known pressor-antidiuretic activity, vasopressin effects contraction and vasoconstriction in uterine muscle, particularly in the nonpregnant state.

Vasopressin was utilized only in patients less than 40 years of age with normal cardiovascular status. This selection was in view of the coronary-constrictor activity attributed to pitressin administered parenterally. The control patients were unselected. The gynecologic problems were comparable in both groups.

Four units were arbitrarily selected as the maximum dosage, and the technique for dilution and local injection into the uterus or cervix is described.

Local injection into the uterus or cervix was done in 20 gynecologic operations: 13 myomectomies, 3 unification procedures, 3 cervical conization procedures, and 1 hysterotomy as part of a tuboplastic operation. Seventeen concurrent controls were presented. The results and conclusions are summarized as follows:

1. Blood loss in the patients in whom vasopressin was used was markedly and significantly reduced.

2. There were no cardiocirculatory or other significant complications observed in the patients who received vasopressin.

3. Oxytocin and pitocin apparently have no similar hemostatic effect. —*Byford F. Heskett, M.D.*

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Progesterone-Induced Withdrawal Bleeding as a Simple Physiologic Test for Pregnancy. GLEN E. HAYDEN. *Am. J. Obst.*, 1958, 76: 271.

SECONDARY AMENORRHEA occurred in 120 patients with previously regular menstrual cycles. Progesterone was given to 102 patients by the oral, intramuscular, or vaginal routes as a pregnancy test. Failure to note withdrawal bleeding within 14 days indicated pregnancy and this diagnosis was confirmed in 100 per cent of the cases.

Normal cycles were restored in 72 per cent of the patients in whom withdrawal bleeding did occur.

—*M. Leon Tancer, M.D.*

Some Observations on the Histology of the Human Ovary During Pregnancy. W. W. NELSON and R. R. GREENE. *Am. J. Obst.*, 1958, 76: 66.

THIS STUDY deals primarily with the observations on the corpus luteum and follicular structures in the ovary of the pregnant woman.

Wedge-shaped biopsies from the free or convex surface of one or sometimes both ovaries were studied in 43 patients. Thirty-nine of these patients were pregnant and 4 were within 2 weeks of the postpartum. In addition, ovarian tissues were on file in the laboratory from 11 other pregnant patients and from 2 recently delivered patients, making a total of 50 ovarian specimens from patients with intrauterine pregnancies and 6 from patients within 2 weeks of delivery available for study.

Corpora lutea of menstruation and pregnancy are very similar in structure. Their size varies considerably. A corpus luteum found during pregnancy is usually larger than that found during the menstrual cycle. This is true especially during the early part of pregnancy. During the first two-thirds of pregnancy, the corpus luteum is frequently larger than that of menstruation and larger than that of the last one-third of pregnancy. A fluid-filled central cavity was present in all but 3 of the early 19 corpora lutea, but was found in only 6 of 18 term or near-term specimens.

The 2 corpora lutea removed 8 days postpartum were small and without a cavity. Dense connective tissue central cores were present. The connective tissue was well developed and extensive throughout. Hyalinization was present in the central cores and trabeculae. Arterioles were thick-walled, large, opened, and filled with blood. The granulosa cells were small, shrunken, and wrinkled in outline, indicating obvious degeneration. Vacuoles were few, scattered, related to colloid, and degenerative in type. The reticular network remained unchanged. Nuclei became shrunken or pyknotic. Small amounts of colloid were present in the one and calcium in a like quantity in the other. A theca lutein layer could not be identified in either.

Twenty-four ovarian specimens from the laboratory files were studied, since they were associated with ectopic pregnancies. Thirteen of these specimens included the corpus luteum. These corpora resembled those of intrauterine pregnancies.

It is concluded that the following characteristics are peculiar to pregnancy: (1) the greater size of the whole structure of the corpus luteum and of the cavity; (2) the more advanced development of connective tissue and vascular elements; (3) the presence of colloid and/or calcium, and (4) the presence of differentiatingly constituted lipoids as histological criteria important for delineating the corpus luteum of pregnancy.

One may safely label a corpus luteum as concurrent with pregnancy if the granulosa lutein cells contain colloid material or calcium globules.

The ovary during the larger portion of pregnancy, histologically appears to act only as an end organ influenced by extrinsic substances obviously of placental origin.

—*Harry Fields, M.D.*

Diagnosis and Surgical Treatment of Uterine Rupture Following Previous Cesarean Section (Diagnostic et traitement opératoire des ruptures de l'utérus consécutives a une césarienne antérieure). N. LOUROS, P. GAVARIS, and N. BAROUS. *Rev. fr. gyn. obst.*, 1958, 53: 399.

AMONG 24,886 DELIVERIES there were 39 cases of uterine rupture following one or more previous cesarean sections at the Alexandra Maternity Clinic during the years 1951 to 1955. Of these 39 ruptures, 64.1 per cent, or 25, occurred in patients who had had an anterior cesarean section. The fetal mortality was 56 per cent and the maternal mortality was 8 per cent.

Of these 25 patients 18 (or 72 per cent) were treated by repair of the uterine rupture rather than hysterectomy. There was neither serious morbidity nor mortality in this group. The authors believe that prevention of rupture can be accomplished by selecting the proper time for repeat cesarean section and by careful observation for signs of early or impending rupture.

In view of the aforementioned statistics and their good results in the current series, the authors conclude that the proper treatment is suture of the uterine rupture.

—*Donald R. Dye, M.D.*

The Etiology of Pre-Eclampsia; The Possible Role of Noradrenaline. G. GORDON LENNON and J. GARDINER. *J. Obst. Gyn. Brit. Empire*, 1958, 65: 371.

THE HYPOTHESIS is presented that noradrenaline may play a part in the etiology of pre-eclampsia. It may be that the pressor factor in pre-eclampsia comes via the adrenal glands of the fetus or the mother.

Extracts were made from the plasma of pre-eclamptic patients, normal pregnant subjects, and normal nonpregnant controls, and were assayed against noradrenaline standard solutions, the four-point technique being employed.

The method of study involved protein extraction with acid ethanol, one-stage phenol-solvent paper

chromatography, and elution and bioassay with a pressure preparation of rat blood.

The adrenergic blocking agent, dibenyline, having been found consistently effective in neutralizing the pressor effects of both noradrenaline and plasma extracts was tried as a therapeutic agent in cases of pre-eclamptic toxemia. In all, 10 patients with severe cases of toxemia were treated with intravenous infusion of dibenyline in 5 per cent dextrose. In none of these did the blood pressure fail to respond. Dibenyline was given by mouth to 28 women with pre-eclampsia classified as mild or moderate. Judging from these cases dibenyline given by mouth is much less consistent in its effect on the blood pressure. Nevertheless, it was the most consistent hypotensive agent of the whole group studied—including sodium amytal, apresoline, and serpasil.

There were no maternal deaths in the series and none of the women developed eclampsia. As a result of biological and clinical investigations, it is thought that there is evidence that noradrenaline may be the pressor factor in cases of pre-eclampsia.

—*Harry Fields, M.D.*

Ischemic Softening of the Left Temporal Lobe in Pregnancy (Rammollimento ischemico del lobo temporale sinistro in gravidanza). NICOLA ABRESCIA. *Fracastoro*, 1958, 51: 21.

BECAUSE of the rare occurrence of cerebrovascular accidents with hemiplegia in pregnancy, the author feels justified in reporting this case. Barring the ones resulting from embolization and thrombosis due to sepsis, barely 60 cases have been found in the literature. This case report concerns a 33 year old multipara who at 7 months of gestation began to experience a severe cephalalgia with mental confusion to the point of not being able to answer questions. Incoherent psychomotor movements of the entire body were present in addition to the severe headache which became more and more intense as time went on. Two days prior to admission an episode of vomiting of the gastric contents took place.

The illness started about 2 weeks before her admission to the hospital in a semicomatose state. The patient was never febrile at any time. A positive Kernig sign was present together with increased intraocular tension and choked disc, and with signs and symptoms of focal pressure over the left hemisphere. A right facial palsy was also noted at the time of admission to the hospital. The unfavorable course of events made it imperative to induce labor. This was successfully accomplished and a live premature female infant was born, weighing 1,200 grams, but it did not survive for more than a couple of hours.

All of the foregoing considerations made one think that the cause of this disturbance could be ascribed to the presence of a brain neoplasm. Guided by this reasoning, a left temporal craniotomy was done with excision of some edematous brain tissue. A plastic, decompressive repair of the dura was performed in closing the wound. The postoperative diagnosis was ischemic softening of the left temporal lobe. Marked and rapid improvement was noticed after the operation with the return of power in the right arm and leg. The power of speech was restored, except for a considerable amount of sensory aphasia which was still present after several months. In addition, there was noted a right homonymous hemianopsia. The general condition otherwise was reported to be excellent.

The author concludes by emphasizing that at no time in the entire history was there any sign of inflammation or febrile reaction. The only constant factor brought to the reader's attention is the clear and unmistakable sign of increased intracranial pressure. The slow, insidious onset of the illness reminds one of a gradually forming cerebral thrombosis, which may be attributed, in part at least, to a generally feeble organism as shown by a 50 per cent hemoglobin, and general malnourishment leading to an impaired cerebral circulation. Pregnancy may have played a part in this whole picture in some unknown manner. All these unfavorable conditions may have prepared the way for the cerebral thrombosis with resulting ischemia of the adjacent brain substance.

—*Vincent Ippolito, M.D.*

The Current Status of the Pregnant Cardiac. JACK M. KAUFMAN and PAUL E. RUBLE. *Ann. Int. M.*, 1958, 48: 1157.

THE MANAGEMENT of the pregnant cardiac patient or the nonpregnant patient in the childbearing age has undergone remarkable changes in recent years primarily because of the availability of the antibiotic drugs and surgical techniques which will correct many of the serious cardiac lesions. The increased cardiac work necessitated by increased blood volume is most pronounced from the sixteenth week of pregnancy to the thirty-second week, with an exacerbation in the immediate puerperium. Cardiac surgery is now considered quite safe and in fact is attended by a lower mortality than the disease itself. It can therefore be done during pregnancy, although many physicians prefer that surgery be performed in the interim between pregnancies.

At the Harper Hospital in Detroit the requirements for valvulotomy are dyspnea on ordinary activity, definite mitral stenosis on the basis of physical findings, electrocardiogram, roentgenogram, confirmatory catheterization, and hemoptysis, and/or embolization. These requirements are considered valid in spite of the functional classification of the patient's cardiac status.

When seen in early pregnancy a patient with mitral stenosis offers three possible choices of therapy. Many can be delivered by close observation and supportive therapy, some can be managed by therapeutic abortion with cardiac surgery at a later date, and the final possibility is mitral commissurotomy during pregnancy. The policy at the Harper Hospital is either to carry the pregnancy under careful management without surgery of any type, or to perform the necessary surgical correction of the valvular lesion. It is not felt necessary to perform therapeutic abortion since this procedure in itself adds an additional load on the heart. In the event the patient is in congestive heart failure, every effort should be made to restore her to a compensated state and then proceed with the necessary cardiac surgery. Again abortion is not thought to be indicated.

In a series of 93 unpublished operations of this type there were 3 maternal deaths, approximately the same mortality that might be expected if nothing was done for the patient other than general supportive therapy. It was thought that at least 2 of these deaths could have been avoided by modern management. If the patient is to be managed medically without surgical therapy she should be seen at least at 2 week intervals; frequent evaluations of the venous pressure, circulation time, vital capacity, and weight gain should be determined. Any alteration in these findings should be considered as impending cardiac failure. All of these patients should have additional rest from the twenty-fourth to the thirty-second week of pregnancy. Any infection, regardless of how severe or wherever it might be located, should be treated actively since infection readily precipitates cardiac failure. Prophylactic use of penicillin is indicated during labor and in the postpartum period. Any degree of anemia should be corrected. Psychotherapy is extremely important.

The management of labor and delivery is of utmost importance. The second stage of labor should be shortened by forceps extraction; oxytocics should be avoided. Breast feeding is not permitted to those patients who show evidence of congestive failure. When the patient returns home additional rest should be procured and help in the management of the home should be secured.

In the past, very few patients with serious congenital heart disease survived long enough to enter the childbearing age. However, many such patients are now reaching this particular period. Many of the congenital lesions are easily correctable by surgery and can be corrected prior to, between, or during pregnancy without any particular concern. One of the most difficult problems encountered occurs immediately following delivery, when the systemic blood pressure falls and the cardiovascular shunt may shift from the arteriovenous variety to the venoarterial type, leading to rather rapid cyanosis and death. Arterenol given by intravenous drip may be of assistance in maintaining the systemic blood pressure levels so that this complication can either be avoided or corrected.

In estimating the type of patient who will tolerate the congenital anomaly during pregnancy, certain factors are of importance. These are previous heart failure, advanced age, atrial fibrillation, and cardiomegaly, in addition to other evidence of congestive heart failure which may indicate a very poor prognosis and thus indicate immediate surgical correction. All cardiac patients should be individualized and managed carefully. If so done, there is no reduction in the anticipated life span of the patient.

—James F. Donnelly, M.D.

High Potency Progesterone Drugs and Threatened Abortion. C. Paul Hodgkinson, Eli J. Igna, and Alfred P. Bukeavich. *Am. J. Obst.*, 1958, 76: 279.

Threatened abortion characterized by active uterine bleeding was observed in 61 patients treated with high potency progesterone drugs (delalutin and norlutin) and in 297 patients treated with bed rest and mild sedation. Spontaneous abortion occurred in 84.5 per cent of the control group and in 60.6 per cent of the luteoid treated group. Appreciable delay in the time of abortion was noted in the luteoid treated group as was a tendency to early delivery. None of the infants born to mothers in the study group showed evidence of abnormal secondary sex characteristics.

—M. Leon Tancer, M.D.

Incomplete Abortions; A 25 Year Review of Cases Seen at a Large Municipal Hospital. M. Leo Bobrow and Stanley Friedman. *Am. J. Surg.*, 1958, 95: 938.

In a most concise and interesting fashion the authors present a review of 15,000 abortions seen on the abortion service of the Harlem Hospital during the past 25 years. On their service all abortions are considered to be infected. On a clinicopathologic basis they are divided into various categories or types. Through the years under consideration, antibiotics and chemotherapeutic agents have altered the clinical course of abortions and have necessitated reconsideration of the clinical classifications.

The authors review their treatment for each category—both the chemotherapeutic and surgical aspects. In the less severe infections, the chemotherapeutic and antibiotic agents have markedly reduced the morbidity and mortality, and in many have kept infections localized to the pelvis. When confronted with general peritonitis the authors think that prompt surgery offers the best hope for recovery.

—Donald R. Dye, M.D.

LABOR AND ITS COMPLICATIONS

Induction Experience in a General Hospital. Morris P. Wearing. *Canad. M. Ass. J.*, 1958, 79: 28.

The experience with induction of labor at the Victoria Hospital of London, Ontario for the period of 1952 to 1956 is presented. The incidence of inductions was 6 per cent. The percentages for the indications for induction were: 40, convenience; 26, post-maturity; 19, toxemia; 6, irregular pains; 4, ante-partum bleeding; 2, Rh factor; and 1, early rupture of membranes.

The most common method of induction was by amniotomy with the use of pitocin on the increase, particularly in recent years. It was stated that induction was not carried out unless the cervix was adequately prepared. Fetal hazard was considered to be 0.8 per cent and specifically due to the induction. There was no maternal mortality in the series.

—James F. Donnelly, M.D.

Rupture of the Uterus. Paul Pedowitz and Arthur Perell. *Am. J. Obst.*, 1958, 76: 161.

Eighty-seven cases of rupture of the uterus constitute the material studied by the authors. Fifty-two were from the Jewish Hospital of Brooklyn and 35 from the Kings County Hospital. The incidence in the over-all series was one in 1,508 deliveries. The incidence at the municipal hospital was slightly greater than that of the voluntary institution. The incidence at both centers would have been higher if all cases of occult or silent ruptures of cesarean section scars had been known for the entire period surveyed. The ma-

ternal mortality was 14.9 per cent and the fetal mortality was 33.3 per cent.

A laceration involving the lateral aspect of the lower uterine segment and cervix is far more serious than one in the fundus, and accounted for 7 of the 8 deaths due to rupture during labor. Subtotal hysterectomy is inadequate therapy in these cases, as it will not effect hemostasis when the cervix and the vagina are involved. In this situation total hysterectomy is indicated even though it is slightly more time-consuming than the subtotal operation; however, it is accomplished more quickly and with greater ease in the pregnant than in the nonpregnant patient. Furthermore, once the cervical and uterine arteries involved have been ligated, a total hysterectomy is practically accomplished except for ligation of the parametrium on the uninvolved side. The additional few moments needed to complete the total hysterectomy will not materially increase the risk to the patient and will obviate the danger of continued hemorrhage from a laceration below the level of transection.

Colporrhexis commonly occurs when the uterine laceration involves the cervix. When one realizes that the vaginal mucosa is reflected onto the cervix and that the parametrium is attached to the lateral aspect of the cervix and the vaginal vault, it then becomes obvious that complete laceration of the cervix will almost invariably involve the vagina. Because of the marked vascularity of this region, the resultant bleeding is often profuse and hysterectomy per se will fail to control the hemorrhage from the vaginal component of the uterine rupture. Thorough exploration of the vagina should be performed in all cases of uterine rupture involving the cervix, both prior to and following hysterectomy. If a laceration is discovered and visualization is not obscured by the hemorrhage, it should be repaired while the operating room is made ready.

Rupture involving the lower uterine segment is associated with a higher maternal mortality than rupture of the fundus.

Version, with its inherent dangers, is best relegated to history except for delivery of a second twin or the rare case of a multipara with a transverse presentation, who reaches full dilatation with the membranes intact and in whom there is no evidence of cephalopelvic disproportion.

The relatively high incidence of rupture of previous cesarean section scars is a reflection of accurate recording of the condition of all scars at the time of elective cesarean section. —*Charles Baron, M.D.*

Rupture of the Uterus; A 20 Year Report from the Boston Lying-In Hospital. Robert K. Ferguson and Duncan E. Reid. *Am. J. Obst.*, 1958, 76: 172.

During a 20 year period at the Boston Lying-in Hospital from 1935 through 1955, rupture of the uterus occurred 84 times among 101,108 deliveries, an incidence of 1 to 1,204. The over-all maternal mortality was 5.9 per cent and the total fetal mortality was 29.4 per cent.

The scar of a cesarean section was determined to be the cause of rupture in 60 cases (71 per cent). Eighteen of these were overt and 42 were silent dehiscences. Spontaneous uterine rupture occurred 15 times (18 per cent). Obstetrical trauma was the cause of rupture in 9 cases (11 per cent). Three cases occurred because of unusual suprapubic pressure.

The dangers of pituitrin used to stimulate labor, particularly in the multiparous patient, must continue to receive attention. Two patients experienced rupture of the uterus after labor was electively induced by amniotomy followed by pituitary stimulation.

It is difficult to take issue with the dictum "once a cesarean, always a cesarean." It is concluded, therefore, that the most important single factor in the prevention of rupture of the uterus lies in the indication for the first cesarean section.

—*Charles Baron, M.D.*

Recent Trends in Cesarean Section; A Review of 2,066 Consecutive Operations. Edward G. Waters. *Obst. Gyn.*, 1958, i1: 650.

This is a review of 2,066 consecutive unselected cesarean sections in a group of nearly 52,000 deliveries from the Margaret Hague Maternity Hospital, Jersey City, New Jersey. The incidence was less than 4 per cent. The most frequent indication (in 1,044 cases, more than one-half of the series) was fetopelvic disproportion, but the general attitude regarding this group became increasingly conservative as overconfidence in roentgenological diagnosis disappeared. Excluding 550 cases of repeat sections, hemorrhage constituted the next large group of indications. About half of 262 cases were due to abruptio and placenta previa, but it must be taken into account that only 20 per cent of all separations of the placenta are treated by cesarean section as against 70 per cent of cases of placenta previa. Toxemia of pregnancy accounted for 9 per cent of the cases (190 sections), including 7 instances of eclampsia. There is no doubt that prompt abdominal delivery in nonresponding toxemia gives excellent results and reduces eclampsia and its associated mortality dramatically. Fetal distress, prolapsed cord, malpresentation, and diabetes accounted for the remaining 10 per cent of the cases. For diabetes (30 per cent of the diabetics had sections) this operation is not the perfect solution since fetal loss is still too high. A variety of other causes may necessitate abdominal delivery, including such combined secondary indications as breech presentations in elderly primigravidas.

Repeat cesarean sections were done only in about half of the patients, and women allowed to deliver from below were carefully evaluated as to the usual criteria of nonrecurrent indication, absence of infection, and competence and location of the scar. A physician was always in attendance and blood available. The hazard of pitocin induction and the increased danger of rupture of the scar when in the classical location was borne out in this series. The impression was also gained that a successful vaginal delivery following section is no insurance against a subsequent rupture. While rupture of a cesarean scar in labor is rarely fatal, it generally means death for the fetus and loss of the uterus. There were 6 uterine ruptures in this series, 3 of which occurred after previous section. Defects of the uterine scar were encountered in 11 cases without mortality. From these figures it appeared that one could expect a defect in an old scar

once in 150 patients, and rupture of the uterus once in 300 to 350 patients with a previous section scar.

Puerperal infections, including infections of the urinary tract (20 cases) and wound infections (15 cases), occurred in 354 patients, or 17.1 per cent; hemorrhage over 500 c.c. in 308 patients, shock in 42, phlebitis in 16, and dehiscence in 8 patients. The 2 latter complications are more common after cesarean section than after most abdominal operations. Low cervical section, generally with a transverse uterine incision, is now employed in about 70 per cent of the cases, and the extraperitoneal procedure is used in nearly 30 per cent. The author is convinced that the latter operation with supravesical approach is superior in all bad risks and infected cases no matter whether antibiotics are used. This is true especially because the value of antibiotics has become dubious with the emergence of resistant strains of bacteria. Except for 2 deaths after introduction of the Waters' operation in 1937, there has been only one death in a series of nearly 1,000 cases since 1940. Spinal anesthesia had been the method of choice in at least 95 per cent of the cases and it has often been the deciding factor in maternal salvage. Present day mortality for cesarean section under favorable hospital conditions should not usually exceed one in 1,000 cases.

—W. D. Bergman, M.D.

NEWBORN

Pulmonary Hyaline Membrane Contamination of the Lungs by Fluid of the Birth Canal. FRANKLIN F. SNYDER. *Obst. Gyn.*, 1958, 11: 599.

THE CELLULAR DÉBRIS and blood of the birth canal provide tracer material by which the frequency and magnitude of contamination of the fetal air passages during labor can be estimated. Since it has been shown that a respiratory tidal exchange of fluid is a normal part of intrauterine life before birth, it remains to be determined how much foreign matter in the airways is normal and when it causes disease.

In this experimental study 281 rabbits born at full term (31 days) in 130 litters were subjected to necropsy and microscopic examination of the lungs after they had died during labor (194 stillborn), or within 24 hours after delivery (87 cases). The maternal animals had received demerol (40 mgm./kgm.), methadone (6 mgm./kgm.), or a morphine derivative at term when in labor, and usually the dose was repeated after 4 hours. None of the animals was oversedated. There was an unsedated control group of 164 animals, none of which died and which were sacrificed by chloroform inhalation, and also subjected to necropsy.

Of the group of perinatal deaths 95 per cent showed erythrocytes and a variety of cells and débris in the lungs, and this infiltration was massive in 60 per cent of the stillbirths and 30 per cent of the neonatal deaths. In the rabbits which survived passage through the birth canal but died within 24 hours, expansion of the lungs had produced displacement of the foreign matter along the walls of the alveoli and bronchioles in a pseudomembranous layer, which appeared as a clue to the origin of the eosinophilic substances of hyaline membrane disease. These membranes were not seen in stillborn rabbits in which respiration was never established, and in most of these cases the alveoli and other air spaces were found in a state of partial dilatation such as characterizes intrauterine life. Atelectasis and emphysema were also widespread, especially local atelectasis adjacent to the membranous layer in premature animals. None of the rabbits in the control group showed these massive changes, but several had minor amounts of foreign matter in the air passage as evidence of rather physiological fetal respiration during the second stage of labor.

There was also significant evidence of prolonged labor (up to 6 hours from a normal of 30 minutes) in sedated animals, and the perinatal mortality in 130 sedated litters (at least one death in each litter) reached 52 per cent compared with a normal mortality of less than 6 per cent in 1,000 births in the same rabbit colony. The duration of labor, obviously, magnified the hazard of aspiration of foreign matter greatly. Anoxia, as caused by sedation, increased the respiratory rate in the maternal animal and, at the same time, caused respiratory depression and apnea in the fetus as early as one-half minute after injection. This effect, together with the well known increased fetal tolerance to anoxia, can be considered a defense mechanism against oxygen depression. However, the figures point out a very definite danger of analgesic medication during labor. *—W. D. Bergman, M.D.*

MISCELLANEOUS

The Passage of Radioactive Strontium Through the Placenta and Milk (Sul passagio dello stronzio radioattivo attraverso la placenta e il latte). U. MARINONI and S. AVANZINI. *Ann. ostet. gin.*, 1957, 79: 147.

THIS STUDY was conducted on guinea pigs which had received isotope strontium 89 at the onset of pregnancy. Strontium appeared more concentrated in the cranial bones than in the bones of the extremities.

Strontium given during the period of lactation to guinea pigs was found in the milk and was more uniformly distributed in various bones.

—Alexander J. Conte, M.D.

Cervical Tampon; Synchronous Test for Ovulation. JOSEPH B. DOYLE. *J. Am. M. Ass.*, 1958, 167: 1464.

THE AUTHOR describes a test for ovulation which depends upon a sharp rise in the content of glucose in the cervical mucus at the time of ovulation. It utilizes the basic biochemical principle that the variations in reducing substances result from a hydrolytic splitting of cervical mucus-releasing or glycogen-releasing glucose in the mucus cascade which pours from the cervix during the ovulatory phase.

The test is simple, inexpensive, and can be performed at home. Tes-Tape (a strip of paper impregnated with the enzyme, glucose oxidase) is held over the tip of a plastic or cardboard tampon. The tampon is inserted for three to five minutes into the vagina so that it comes into contact with cervical mucus. When glucose is present, the tape assumes a bright leaf green to deep green color. The tampon can be read as late as 36 hours after use. There appears to be a good correlation with the quantity and spinnbarkeit of mucus discharged and with the intensity of the fern pattern.

Two cases are described in which the follicular fluid of a recently ruptured follicle and the vaginally aspirated cul-de-sac peritoneal transudate were studied as confirmatory evidence. One woman, a 30 year old nulligravida, usually had a basal temperature thermal shift on day 13 to 14. The plastic tampon was inserted vaginally for two preceding days and there was only faint green coloration; on day 14 it became a brilliant deep green. Fluid aspirated from the cul-de-sac produced a moderately positive result. Culdotomy was performed and a fresh corpus hemorrhagicum was found on the right ovary. The corpus hemorrhagicum was excised and was dated as being approximately 12 hours old. The other woman was a 21 year old nulligravida with a bicornuate, unicollis uterus. On the morning of operation for metroplasty and paracervical denervation, the cervical mucus glucose test was mildly positive. Aspiration of the cul-de-sac produced fluid which caused a deep green color of the Tes-Tape. At operation a fresh corpus hemorrhagicum was found in the left ovary. By biopsy the corpus hemorrhagicum was estimated to be about 12 hours old.

The Tes-Tape method of determining ovulation can be utilized as a supplement to the rhythm method. It is suggested that coitus be restricted until four days after the appearance of the deep-green color of the Tes-Tape if conception is to be avoided.

—*Warren R. Lang, M.D.*

Sterilization of Women by Intrauterine Electrocautery of the Uterine Cornu. B. H. SHEARES. *J. Obst. Gyn. Brit. Empire*, 1958, 65: 419.

THE PROBLEM of the grande multipara in Asia is real and the solution to safeguarding her against hazardous pregnancies is sterilization. The simplest of all procedures is cautery-stricture of the cornual ends of the fallopian tubes. This method of sterilization can be carried out as an office procedure of 5 to 10 minutes in a properly equipped family planning clinic.

Intrauterine electrocautery of the uterine cornua was performed on 128 women, 229 times. The Hyams technique was used in 48 women, 11 of whom were subsequently cauterized by the use of a new electrode. Of 37 women cauterized only by the Hyams electrode the success rate was 57 per cent and there was 1 death from generalized peritonitis. Of 91 patients cauterized by the new electrode, the success rate was 91.2 per cent and there were no deaths or serious complications.

The technique of the procedure is as follows: the operation must be carried out within the first 5 days following the cessation of menstruation. No anesthetic, either general or local, is necessary. The patient empties her bladder before the procedure is done. The whole operation does not require more than 10 minutes. With the patient in the lithotomy position, and the vulva and vagina prepared, a bimanual examination is carried out to appraise the size and position of the uterus and the state of the adnexa. Any gross abnormality of the uterus or of the adnexa is a contraindication. If the uterus is retroverted, it should be replaced in the upright position. A graduated uterine sound is introduced into the uterine cavity to determine its direction and length. The angle at either tubouterine junction is located with the sound and its directions and character determined. The sterilized instrument, with the metal electrode designed for the left side attached, is held as if it were a pencil and passed into the uterine cavity with the concavity upward. A stethoscope is positioned over the suprapubic region of the patient's abdomen a little to the left side of the midline. A sizzling sound will be heard with the stethoscope approximately 15 seconds after the switch is thrown. Cauterization is carried on for approximately 15 seconds. After the coagulation the instrument is withdrawn, and, if the burning has been carried to an adequate degree, it will be noticed that the electrode adheres slightly and brings away a shriveled cover of burnt tissue all about it. The coagulation is then repeated on the other side using a second instrument already prepared for the purpose with a right-sided electrode attached.

Coitus is interdicted until Rubin's test for tubal patency has been carried out, unless contraceptive precaution is acceptable to the patient in the interim.

After a minimum interval of 10 weeks, and at the appropriate time in the menstrual cycle, the end result is determined by transuterine insufflation with carbon dioxide. The pressure is maintained for 5 seconds at 220 mm. Hg, and if there is no escape into the tube as determined by auscultation, it should be presumed that scarring from the burn has effected stricture and occlusion.

—*Harry Fields, M.D.*

GENITOURINARY SURGERY

ADRENAL, KIDNEY, AND URETER

A Clinical Evaluation of Nephrotomography. W. F. Southwood and V. F. Marshall. *Brit. J. Urol.*, 1958, 30: 127.

Opacification of the renal parenchyma is often noted during excretory pyelography especially when there is delayed function of a previously normal but now acutely obstructed kidney. Evans *et al.* reasoned that such opacification might be useful in the differential diagnosis of intrarenal masses and devised a practical technique which is somewhat similar to aortography via direct lumbar puncture.

Aortography as usually employed requires general anesthesia, and serious complications, including fatalities, have been described. Nephrotomography, as described by Evans and his associates, requires no anesthesia, largely eliminates confusing gas shadows, provides much information concerning the arterial tree, concentrates on the opacification of the parenchyma as the diagnostic tool, and has had no subsequent serious complications in more than 300 examinations.

This technique is described in detail and involves tomography with intravenous injections of decholin and hypaque, the former to indicate the circulation time for proper timing of the films, and the latter to serve as a contrast medium for the arteriograms and nephrograms.

The interpretation of these films is similar to that after direct aortography. In brief, cysts fail to opacify, but renal parenchymal neoplasms usually do so. In the arteriographic phase, a cyst within the parenchyma shows as an almost avascular area generally circular in outline, while a neoplasm usually appears as an irregular blotchy opacification at the end of small abnormal vessels within the tumor area. On the second film, the nephrogram, a cyst usually appears as a circular lucent area surrounded by evenly opacified parenchyma, except for a common tendency to have a 1 to 2 mm. halo of increased density, while most intrarenal neoplasms show an irregular blotchy opacification which is usually not so circular in outline nor as well defined about its periphery as a cyst.

The tomographic technique in succeeding films eliminates the obscuring effects of overlying gas and permits the visualization of both kidneys through one plane. Although detailed studies have not been made, it is thought that masses larger than 2 cm. in diameter should be visualized, but it would be difficult to evaluate masses smaller than 1 cm. in diameter routinely.

Renal parenchymal neoplasms often break down in the center to become cystic and the center of such a tumor will not opacify readily. However, when this exists, there is viable surrounding carcinomatous tissue which opacifies irregularly, and since the central necrotic area is rarely spherical, the outline of the lucent area will usually be irregular. Cysts or neoplasms at the surface of the kidney displacing only a minimal amount of renal parenchyma are difficult to interpret because their location does not usually permit a clear contrast with the opacification.

—*Edward J. Frishwasser, M.D.*

Foreign Bodies in the Kidney; Case History of an Intracalyceal Needle (Les corps étrangers du rein un cas d'aiguille intra-calicienne). J. Naulleau and Sami Sakka. *Presse méd.*, 1958, 66: 705.

A 21 year old male had experienced progressively severe attacks of pain in the left flank since he was 4 years of age. About at that time the patient had nephritis. The discomfort was usually provoked by physical activity, accentuated by flank percussion, and was relieved by change of position. There was no history of dyspepsia, abdominal distention, or urinary distress. On urography, two intrarenal lesions were seen and at nephropyelotomy two calcareous encrusted needle fragments were removed.

As in other similar cases there was no definite way of knowing how the foreign body gained access to the kidney. Accidental forgotten puncture did not seem reasonable since trauma is usually recognized. More likely it was silent migration of a foreign body from the digestive to the urinary tract, probably into the bladder. Ureteral antiperistalsis has been induced experimentally to point up possible ascending urinary tract migration of such objects. Foreign bodies may penetrate the second portion of the duodenum, which may explain why they are more commonly found in the right kidney than in the left. Nephritis may be indicative of the presence or the passage of foreign bodies.

In reviewing the reports in the literature, hairpins, toothpicks, and fishbones have also been found in the kidneys.

Treatment is by extraction or nephrectomy. Films should be taken on the table at the time of surgery to rule out additional or remaining foreign bodies.

—*Henry Ritter, M.D.*

Nephrocalcinosis; A Roentgenologic, Biophysical, and Histologic Study. Bengt Engfeldt and Curt Lagergen. *Acta chir. scand.*, 1958, 115: 46.

The results of a study of nephrocalcinosis, employing microradiography and roentgen crystallography, are presented. For this purpose one or both kidneys were removed in 103 consecutive routine autopsies. The kidneys were cut into sections about 1 cm. thick. These were studied with standard roentgenography and, if calcific deposits were noted, the affected parts of the kidney were embedded in paraffin and sectioned to thicknesses of about 200 microns. The sections were photographed and those which contained calcifications were studied with microradiographic technique. The specimens were then sectioned to about 10 micron thickness for study with extremely soft roentgen rays and microscopy. The chemical composition of the calcified deposits was determined by microcrystallographic analysis.

In 25 per cent of the cases the kidneys showed calcifications with diameters exceeding 0.1 mm. In all these cases there was also microscopic calcification, mainly intratubular. The chemical composition of the microliths as determined by crystallography showed the two varieties of calcium oxalate ($CaC_2O_4 \cdot H_2O$ and $CaC_2O_4 \cdot 2H_2O$) and basic calcium phosphate, or apatite, $(Ca_{10}(PO_4)_6(OH)_2)$.

The authors believe that the series of roentgenographic methods employed in this study are superior to the customary methods of studying nephrocalcinosis. —*Laurence F. Greene, M.D.*

Intrarenal Arteriovenous Fistula with Hypertensive Cardiovascular Disease. FRANK MILLOY, JR., EGBERT H. FELL, ROBERT F. DILLON, and AGENOR M. ZAYAS. *Am. J. Surg.*, 1958, 96: 3.

AN INTRARENAL arteriovenous fistula is a unique pathologic entity. It is capable not only of producing the physiologic effects of a systemic fistula, but also the effects of renal ischemia. This is rather an esoteric subject and only 11 cases have been reported in the literature, exclusive of those occurring between the renal artery and vein following nephrectomy. These have been reported but are not considered here since in the absence of the kidney a Goldblatt ischemia cannot be effected. Of the 11 cases of arteriovenous fistula that have been reported, only 2 were of traumatic origin. The others were definitive or of undeterminable causes.

The authors report the twelfth case of arteriovenous fistula of the renal vessels, which is only the third case of traumatic etiology. The patient was a 32 year old woman who had injured herself in the left flank when she fell on a knife in a watermelon patch at the age of 10. The blood pressure was 150/104 mm. of mercury. There was 2 plus pitting edema and albuminuria and the rest of the examination was essentially normal. An intravenous pyelogram revealed both kidneys to be essentially normal (in 5 minutes), except for distortion of the upper part of the left pelvis. Cardiac catheterization demonstrated moderate failure of the left side of the heart and decreased cardiac reserve. The left kidney was then explored and the renal vein was found to be enlarged three or four times the normal size and transmitting a thrill. The renal artery and vein were dissected and when it was apparent that the fistula was well within the kidney parenchyma, nephrectomy was performed. The patient had an uncomplicated postoperative course and no longer has symptoms of cardiac failure, although her blood pressure has remained moderately elevated at a level of about 160/90 mm. Hg, during the first postoperative years.

Systemic arteriovenous fistulas fall into two etiologic categories, acquired and congenital. The acquired fistulas are most often single communications between the large arteries and veins while congenital arteriovenous fistulas are most frequently multiple and involve smaller vessels. The physiologic effects of an arteriovenous fistula should be considered from two aspects: first, the central effects of the lesion on the systemic circulation as measured by pulse, blood pressure, and other appropriate determinations, and second, the effect of the lesion upon the large tissues distal to the fistula. It is not important to discuss the central physiologic effects of the fistula as this has been done previously, but it is noteworthy that peripheral arteriovenous fistulas other than those of the renal vessels do not cause significant elevation of systolic pressure. The effects of the fistula on the tissues distal to it are not so easily predicted or determined. A few general statements may be made. Usually, there is an ischemia of the distal tissues supplied by an artery involved in an arteriovenous fistula caused by the short-circuiting effect of the lesion. Actually, the effect of the fistula depends upon the relationship of its size to the caliber of the vessels in which it lies. The phenomenon of creating hypertension by partial constriction of the renal artery as described by Goldblatt is well known. The Goldblatt kidney is known by most urologists.

The present theory is that renal artery constriction causes the kidney to produce renin which reacts with a plasma constituent, hypertensinogen, an active pressor substance, angiotonin or hypertensin. If the kidney is removed in the early stages of this condition, the blood pressure changes are reversible. There is a general consensus that nephrectomy for unilateral kidney disease causing hypertension, gives only fair results.

On a theoretical basis, this may be accounted for by the fact that after a certain period of the Goldblatt effect, degenerative vascular changes are responsible for hypertension, replacing the humoral factors which originally operated. Thus, a patient treated by nephrectomy after these vascular changes had taken place, would not be immediately benefited and would only be benefited if the changes were still reversible. Presumably in the patient presented here, the 22 year duration of the fistula explains why the hypertension was not reversible.

Experimental work has been done with arteriovenous fistulas to demonstrate that they can simulate the Goldblatt kidney. It is believed that there is an ischemia distal to the fistula and experimental evidence seems to indicate that there is a decreasing pulse pressure in the kidney. This simulates the partial occlusion of the renal artery in the Goldblatt clamp. —*John Herman, M.D.*

Techniques of Pyeloplasty (Methoden der Nierenbeckenplastik). B. BIBUS and R. HOHENFELLNER. *Chirurg*, 1958, 29: 673.

THIS REPORT is based on a study of 42 cases of hydronephrosis due to ureteropelvic obstruction. Obstructions of the ureteropelvic junction are most commonly due to aberrant vessels or bands.

Strictures of the ureter in this area are quite rare. In many instances the hydronephrosis which develops from the obstruction will cause vague symptoms which frequently are not properly interpreted until infection or stone formation ensues.

At the operation it is important to freely expose the ureteropelvic junction. Aberrant vessels are first compressed digitally to make certain that their ligation will not be compromising the blood supply to the kidney. If this does not occur, the vessel can be severed. Bands, which compress the ureteropelvic junction, are readily excised.

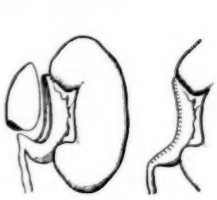


FIG. 1.

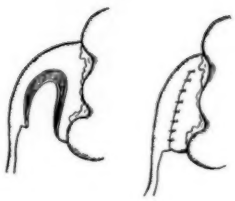


FIG. 2.

FIG. 3.

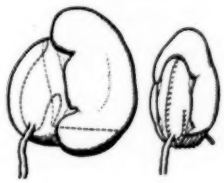


FIG. 4.

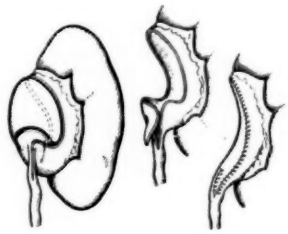


FIG. 5.

FIG. 6.

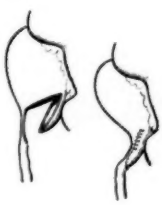


FIG. 7.

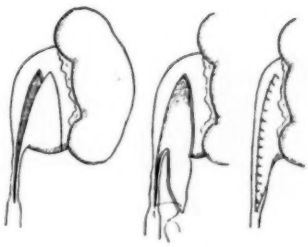


FIG. 8

FIGS. 1-8. (Bibus, Hohenfellner).

Essentially, one of the following three procedures is usually employed:

1. Reduction of the size of the renal pelvis. This is the most common operation.
2. Enlargement of the ureteral lumen without the need for resection of the renal pelvis. This is rare.
3. The combination of the above two procedures.

The most common procedure employed in this series consisted of a subtotal resection of the hydronephrotic sac according to Hryntschak (Fig. 1). The other procedures which have been recommended and which have occasionally been performed can be seen in Figures 2 to 6, inclusive.

Ureteral strictures can be incised longitudinally and sutured according to the method of Fenger, an operation frequently favored in the literature, or they can be incised longitudinally and left open to heal-over spontaneously. To excise the strictured area and to implant the ureter into the pelvis (pyeloureteroneostomy) is not recommended because of the belief that this will interfere with the peristaltic action of the ureter. Finney's pyeloplasty is advised if the ureter does not leave the renal pelvis at its most dependent portion.

For other procedures utilized to correct a stricture of the ureteropelvic junction see Figures 6, 7, and 8. The method of Culp (Fig. 8) is recommended particularly. Only 2 of the 42 patients had a recurrence of hydronephrosis. The others are considered cured.

—*S. Richard Muellner, M.D.*

Indications for Nephropexy. Description of a Perirenal Operative Technique (Plaidoyer pour la néphropexie. Description d'une technique personnelle de cette opération). P. DERYCKE. *Acta urol. belg.*, 1958, 26: 48.

DEFENSE of the much maligned nephropexy is offered. Operative indications include obstruction to urinary drainage from the ureter or kidney, recurrent infection, stone, and severe backache. Not all low or displaced kidneys are painful.

A high incidence of postoperative complications after routine nephropexy, such as pain, pleural adhesions, pulmonary embolism, and infection, is common. Poor technique and erroneous case selection are usually the factors responsible for the postoperative failures.

In the old Marion-Albarran technique, four strips of renal capsule were tied to sutures suspended over the lower ribs with at least 21 days of postoperative recumbency or Trendelenburg position.

In the author's technique a hammock is created with kangaroo tendon below the kidney, after the upper one-third of the kidney is decapsulated. This sling is sewn to the renal capsule with nylon or linen and then suspended over the eleventh and twelfth ribs in the renal fossa. In the postoperative period no Trendelenburg position is necessary and ambulation is started on the fourteenth day. Excellent results are reported in 40 cases with no infection and little dilatation of the renal pelvis. Tendon reabsorption is slow but complete. With other hammock suspension techniques employing stainless steel mesh and nylon net, the problem of nonabsorbable materials was encountered.

In another technique the renal capsule is tied to adjacent fascial structures to prevent kidney rotation, and in yet another operation in-and-out capsular sutures are placed longitudinally and transversely for suspension and fixation.

The author believes that his method, rather than the others described, meets the requirements of simplicity in performance, low operative risk, maintained renal reposition, enhanced renal evacuation, and few postoperative complications.

—*Henry Ritter, M.D.*

The Pathogenesis of Some Forms of Ureteral Dilatation (Sulla patogenesi di alcuni tipi di dilatazione ureterale). CARLO CATELLO and ALBERTO CILENTO. *Gior. ital. chir.*, 1958, 14: 205.

EIGHT CASES of ureteral dilatation of probable congenital origin are reported.

The first patient was a thin and anemic 28 year old male. Five years previously he had suffered total hematuria for 4 days and since had suffered attacks of pollakiuria, moderate hyperthermia, and pain in the left flank. The roentgenographic examination disclosed a bilateral vesicoureteral reflux and ureteropyelectasia.

The second patient was a thin and anemic, 38 year old primipara who began to suffer urinary disturbances (pollakiuria and burning sensations upon urination) and attacks of fever and chills. The roentgenologic examination disclosed a bilateral vesicoureteral reflux of urine; the ureters were markedly dilated and tortuous with acute angulation, and the kidneys showed marked hydronephrosis.

The third patient was a 30 year old married woman who had had two pregnancies carried to term. Since the first pregnancy, 5 years previously, she had suffered severe attacks of abdominal pain, vomiting, and dysuria. For the past 6 months she had also had febrile attacks. Retrograde pyelography showed a marked dilatation of the calyces and pelvis of the left kidney, dilatation and angulation of the ureter.

The fourth patient was a 48 year old married woman with 5 normal pregnancies. For the past 2 years she had been suffering from attacks of dysuria, fever, and colicky abdominal pains in the region of the left flank. Roentgenographic examination disclosed a stone the size of a hazel nut in the left ureter, 1 or 2 cm. above the bladder. Intravenous pyelography showed a dilated and ampulliform renal pelvis; the ureter was uniformly dilated and angulated.

The fifth patient was a 40 year old tertipara who for the past 10 years had been suffering episodes of colicky pains in the left lumbar region with pollakiuria and turbid urine. Twenty days previously she had complete hematuria for 5 days. Intravenous pyelography showed poor elimination on the right side and none on the left. Retrograde pyelography on the left side disclosed abnormal dilatation of the inferior and medial portions of the ureter, and on the right side a mildly dilated ureter with hypotonic pelvis and renal calyces. After the catheters were removed, retention of the contrast medium was observed on both sides.

The sixth patient was a 16 year old boy who, for the past 2 years, had been suffering attacks of dysuria and abdominal pain on the left side. Retrograde urography disclosed a relatively small left renal pelvis, an enormous calycectasis, and a markedly dilated ureter.

The seventh patient was a 53 year old married woman with 11 normal pregnancies. For the past 10 years the patient had suffered attacks of pain, vomiting and constipation, and during the past 6 years, episodes of dysuria with colicky pains and a 3 day period of total hematuria. For the past 15 days she also had febrile attacks. Retrograde urography disclosed a bifurcated and dilated right ureter. The left ureter was normal in course and caliber but the superior calyx was lengthened and thickened and the lower calyces were bifurcated.

The eighth patient was a 40 year old male who when 15 and when 34 years of age suffered violent attacks of pain in the left flank, lasting for several days but without further symptoms. A month previously there was another severe attack with vomiting, moderate pollakiuria, and hyperthermia. Intravenous urography showed no elimination from the left ureter. Retrograde urography disclosed marked dilatation of the inferior and middle portions of the left ureter with numerous angulations. Nephrectomy was performed and the excised ureter showed at the level of the pyeloureteral junction and in the middle third of the ureter mucous plicae which protruded into the lumen of the ureter in the form of a valve. The authors assumed this to be a congenital condition.

The findings in these 8 patients with ureteral dilatation, 2 with marked vesicoureteral reflux, 3 with probable achalasia of the sphincter, 1 with bifid ureter, 1 with agenesis of the kidney and contralateral ureter, and 1 with mucosal valvular formations in the ureteral lumen suggest the possibility of a congenital origin of these cases of unexplained ureteral dilatation.

—John W. Brennan, M.D.

Pseudohydronephrosis Resulting from Complete Traumatic Rupture of the Ureter (Pseudoidronefrosi da rottura traumatica completa dell'uretere). G. BLANCATO. *Chirurgia*, Milano, 1957, 12: 16.

A NINE YEAR OLD BOY, while crossing the street, was struck by an automobile. A passing physician picked up the unconscious child and brought him to the Polyclinic of the University of Milano, Italy, where he was assigned to the neurosurgical department.

No fractures were found except a fine fracture line in the right parietal bone, but there were numerous contusions on both the head and body, and a long cut in the right cheek.

The child regained consciousness the same day. His symptoms were primarily those of cerebral contusion. They disappeared after two weeks, except for persistence of a paresis of the sixth cerebral nerve.

Toward the end of the first day, the child began to complain of pain in the right iliac fossa and right flank. There was some meteorism and pain on pressure but no muscle defense. There was a leucocytosis of 14,800; the temperature rose to 38.5 degrees C.

At the end of the second week roentgen examination disclosed some diffuse meteorism of the colon and cecum; the ascending colon was moderately displaced toward the midline.

With antibiotic therapy the temperature and leucocytosis diminished and the meteorism of the colon became less apparent but the abdominal pain persisted and a palpable mass developed in the right flank. At the end of the fourth week this mass was smooth, immobile, and apparently attached to the posterior wall of the right side of the abdomen. It now occupied the entire right iliac fossa. The right kidney could not be visualized with intravenous urography and the right ureter could not be catheterized as far as the renal pelvis.

Six weeks after the accident the right kidney was exposed by a lumbar incision. The right side of the

abdomen was occupied by a huge saccular mass which had pushed the right kidney upward and turned it to a horizontal position with the upper pole directed medially. The sac was filled with urine and communicated with the proximal stump of the right ureter. The upper termination of the distal stump of the ureter could not be located.

Nephrectomy was carried out without difficulty and the convalescence of the patient was without incident. He was discharged as cured on the twentieth day after the operation.

Examination of the removed specimen howed urinary imbibition of the surrounding tissues and interstitial lymphocytic and plasma cell infiltration. The sac was composed of sclerotic connective tissue without a trace of an epithelial lining.

The author believes that the accompanying injuries in this type of case are usually so serious that the patient dies without a diagnosis of the ureteral rupture. —*John W. Brennan, M.D.*

Contribution to the Study of Primary Malignant Epithelial Neoplasms of the Ureter (Contributo allo studio delle neoplasie maligne epiteliali primitive dell' uretere). FRANCESCO CORRADO. *Arch. ital. urol.*, 1958, 31: 97.

THE AUTHOR reviews the literature on primary malignant epithelial neoplasms of the ureter and considers briefly the various pathologic classifications that have been suggested.

He stresses the three cardinal symptoms of hematuria, pain, and renal swelling. The help obtained from detailed roentgenographic investigations, including excretory and retrograde urography, is carefully considered. The differential diagnosis of primary malignant ureteral tumors consists of practically all ureteral diseases, especially calculus and cystic ureteritis. Other conditions to be considered include ureteral varicosities, endometriosis involving the ureter, bilharziasis, blood clots, other primary and secondary pelvic growths, hyperplastic ureteritis, and lymphatic and mesodermal ureteral neoplasms. Because of the rarity of the condition and the often nonspecific clinical and roentgenographic findings, the diagnosis is often missed. It is therefore important to keep this tumor constantly in mind in the differential diagnosis of ureteral lesions.

The prognosis of primary epithelial tumors of the ureter is poor and is influenced by the histologic type and the degree of ureteral infiltration.

The recommended treatment is nephroureterectomy with excision of the periureteral vesical wall.

The author gives full clinical details of 2 patients with this condition to illustrate the aforementioned points. —*A. Wiener, M.D.*

BLADDER, URETHRA, AND PENIS

Some Aspects of the Experimental Induction of Tumors of the Bladder. GEORGIANA M. BONSER, D. B. CLAYSON, and J. W. JULL. *Brit. M. Bull.*, 1958, 14: 146.

IN THIS ARTICLE the authors review the recent literature on bladder tumors and their induction by chemical means. Such tumors in workers in the chemical industry, viz., those working with aromatic amines and azo dyestuffs, have been observed to be more frequent than in the general population and have prompted questions on the nature and mode of action of substances that are carcinogenic to the urinary bladder.

In the experimental production of this neoplasm, workers are faced with numerous problems. The species and even the strain of the experimental animal, the nature and route of administration of the chemical agent, and the carcinogenicity of the agent for sites other than the bladder are a few of the more important considerations. Study of structure-function relationships of supposed carcinogens has led to the suggestion that carcinogenic properties may lie in the metabolites of the agents rather than in the unaltered, parent structure.

The most fruitful technique for the study of bladder carcinogens is the local application of suspected compounds to the bladder epithelium. To achieve a concentration high enough to be effective but not lethal, the compound must be either injected repeatedly by the intraurethral route, implanted as a pellet in the lumen of the bladder or in the submucosal layer, or wrapped in bladder epithelium which is then grafted subcutaneously into the experimental animal. The method of pellet implantation is coming into wider use, although it is not without disadvantages, among them the possibility of physical and chemical reactions and interactions of the pellet vehicle with the bladder epithelium and the possibility that the vehicle itself may be carcinogenic. The authors summarize in tabular form several studies in which bladder implantation of a number of suspected carcinogens was carried out; it is notable that most of the o-hydroxyamines tested were found to be carcinogenic.

The mechanism of formation of aromatic amine tumors has not been definitively elucidated. It is likely that the active agent is urogenous rather than hematogenous. There is evidence that both parent amines and o-hydroxyamines are carcinogenic. Possibly the former are metabolized to the latter, or perhaps both undergo a carcinogenic reaction with bladder tissue, or alternatively the amine might exert its effect by reaction with itself to form a carcinogenic metabolite, or with the vehicle. The question of mode of action requires further study.

The etiology of so-called spontaneous bladder tumors is another area where further investigation is indicated. Dietary factors have been suggested, notably tryptophan and its urinary metabolites, but no conclusive evidence has been adduced.

In summary, the greatest contribution in the past decade to the field of bladder tumor induction has been the development of methods for testing carcinogens by local application to the bladder epithelium. These techniques have provided bases for study of the mode of action of known and suspected bladder carcinogens. Further study of these agents, e.g., their urinary precursors and their metabolites, should be carried out. It is very likely that the advent of radioisotope labeling will greatly facilitate the investigation concerning the metabolism and the tissue interactions of bladder carcinogens.

—*Paul R. Leberman, M.D.*

Neoplasms of the Female Urinary Bladder. C. Bernard Brack, Robert E. L. Nesbitt, Jr., and Houston S. Everett. *J. Urol.*, Balt., 1958, 80: 24.

The authors report a series of 96 cases with a diagnosis of bladder neoplasm. The average age of the patients was 60.2 years. In 63 of them the tumors were considered to be superficial, stages O, A, and B_1 by the combined Marshall-Jewett classification. In 33 they were thought to be deep, stages B_2, C, and D. The symptomatology in this group revealed that hematuria was the most common symptom and seen in 71 per cent. The other symptoms were frequency, pain, dysuria, nocturia, and urgency.

The treatment in this study was as follows: O and A grade tumors were treated by means of electrosurgical fulguration and resection. Group A tumors showing a pathological grade greater than grade 1 were usually treated by the implantation of radon seeds into the bladder wall following fulguration or electrosurgical resection. The dosage was calculated to deliver 7,000 roentgens or more to the tumor. Tumors belonging to group B_1 were treated surgically by means of segmental resection, if it was feasible; and by means of total cystectomy when segmental resection could not be done because of location of the tumor. Occasional segmental resection with reimplantation of the ureter was done. There was no attempt to do pelvic lymph node resection. Most of the patients treated by segmental resection or total cystectomy were given postoperative deep x-ray therapy. Patients thought to be inoperable because of extensive infiltration were often treated by means of transurethral or suprapubic electrosurgical resection combined with the implantation of radon seeds. The treatment was considered to be palliative. Many of this group were treated with deep x-ray therapy as well as radon.

Among the patients treated during the period from 1945 to 1954, the salvage was 33.3 per cent in all cases; 9.4 per cent were lost to follow-up. At the time of the follow-up examination, 5.2 per cent had recurrent bladder tumors. The salvage of those with superficial tumors was 44.4 per cent; of those with deep tumors it was only 12.1 per cent. Fifty-two per cent of the patients were dead at the time of the study. Among 60 patients who were treated for 5 years or more, the salvage was only 28.3 per cent, 56.6 per cent of the patients having died of bladder tumor or some other condition. Ten per cent of this group were lost and 5 per cent had recurrent tumors. Of 39 patients with superficial tumors treated during this period, 16 were living and well, a salvage of 41 per cent. Of those with deep tumors one of 21 was well, a salvage of only 4.7 per cent. Of patients treated surgically by means of segmental resection, 38.8 per cent were living and well.

Only 1 of 15 patients treated by total cystectomy was well, a salvage of 6.6 per cent. The salvage of those with superficial tumors treated by surgery was 38.4 per cent, and of those with deep tumors so treated, only 15 per cent. The best results were obtained in the group from interstitial implantation of radon seeds, usually combined with fulguration or electrosurgical excision. Of the 14 patients thus treated, 9 were living and well, or 64 per cent survival, and 8 of the 9 with group A tumors treated by this method are living and well. Of the 25 with group A and B tumors treated by fulguration alone, 13, or 52 per cent, were well.

Despite the many methods used in therapy, the authors found that the over-all salvage rate in 96 bladder tumors was only 33.3 per cent in all cases, and 28.3 per cent in the 5 year group. The fact that all lost patients were counted as dead, and the fact that the average age of the patients was high, probably contribute to this low figure. Many of these patients had bladder symptoms for some years before the diagnosis of bladder cancer was made. Since any appreciable success depends upon treating the tumor before infiltration of the bladder muscle occurs, cystoscopic examination is mandatory in all cases of refractory cystitis. —*Robert O. Beadles, M.D.*

Tantalum 182 in the Treatment of Bladder Tumors. Gösta Jönsson, Bror Mansson, and Lars Röhl. *Acta chir. scand.*, 1958, 115: 111.

This report presents the authors' experience with the surgicoradiologic technique in the treatment of solitary tumors of the urinary bladder, which has been used for the past 2.5 years in the Urologic Unit in Lund.

Since tantalum 182 (TA 182) was introduced in the Urologic Unit, the principles of treatment have been as follows:

1. Benign, small, and solitary villous papillomas and early multiple papillomas have been treated with transurethral resection and coagulation.

2. Benign, larger solitary papillomas and well defined malignant tumors which have not infiltrated through the bladder wall were removed by partial cystectomy (in exceptional cases by simple excision or coagulation) plus the implantation of TA 182.

3. Multiple tumors too large for transurethral treatment and with frequent recurrences after transurethral coagulation were removed by total cystectomy or treated with radioactive cobalt. In a few cases cystectomy was performed as a life-saving measure in profuse hemorrhage.

4. Tumors which showed perivesical invasion or fixation to the pelvic wall were treated only with external radiation.

If cystoscopy had shown malignancy, the peritoneum was opened for examination of the lymphatics and the liver as a routine procedure in the surgical technique. When the bladder was opened and the tumor area was inspected without manipulation of the tumor, the lesion was brushed with trichloracetic acid and thereafter captured in a suction bell. If possible, resection of all layers of the bladder wall or excision of the tumor base was then carried out. If the tumor lay near a ureteral orifice, the resection was extended to include this orifice and the ureter was transplanted. If the tumor site was in the trigone or near the internal urethral orifice, it was excised or coagulated together with its base by diathermy. Following resection, the wound edges were joined with catgut sutures, which did not include the mucosa. The tantalum needle or needles were then implanted. The technique was that described by Wallace in 1952. Only one needle was used after most resections, with one branch on either side of the suture line. After excision or coagulation of the tumor, as many needles as consid-

ered necessary to cover the tumor area were implanted. In no instance did the number of needles exceed three. They were so placed that the distance between each branch was about one centimeter. The needles were then attached to the tip of a Foley catheter, the cuff being inflated to about 40 milliliters. The bladder was primarily closed. When the treatment was completed, the needles were extracted by removal of the Foley catheter.

The treatment period ranged from 3 days, with a dose of 4,620 roentgens to 15 days with 8,300 roentgens. As a rule the treatment was given for 5 to 8 days and the dose was 5,500 to 6,500 roentgens.

The series consisted of 63 patients with the following histological grading:

1. Benign papilloma (21)
2. Differentiated transitional cell carcinoma (23)
3. Undifferentiated transitional cell carcinoma (19)

Sixty-three cases of bladder tumor were treated with tantalum 182 and the results were analyzed. Benign, large papillomas were present in 21 cases and solitary carcinomas in 42.

TA 182 was implanted intravesically in all cases, usually in combination with partial cystectomy. The classification of malignancy was made by cystoscopy, urography, urethrocystography, and bimanual palpation. Preoperative biopsy was seldom performed. It was the authors' opinion that the relation of the tumor to the bladder wall could not be determined by biopsy and that the procedure involved the risk of implantation metastases.

There were no deaths attributable to surgery.

The postoperative irradiation reactions in the bladder and the subjective reactions were brief and mild in patients with benign papillomas. No recurrence "in loco" or elsewhere appeared during the follow-up of this group. Thus, these results seemed to justify such a radical operation as partial cystectomy plus implantation of TA 182 even in benign, large papillomas.

The 10 late deaths (all from the cancer group) almost all occurred in cases of perivesical extension of cancer at the time of operation. Partial cystectomy with TA 182 implantation should therefore be reserved for tumors which have not infiltrated through the bladder wall. —*Conrad A. Kuehn, M.D.*

Micturition in Urethral Stricture. BODO VON GARRELTS. *Acta chir. scand.*, 1958, 114: 466.

A METHOD devised by the author for analyzing micturition in the normal male has been previously presented (*Acta. chir. scand.*, 1956, 112: 326–340). By this method, the urine is collected in a cylindrical container. The changes in the pressure at the base of the container are translated into electrical equivalents which, after amplification, are recorded by a photokymograph. In this way, by electrical derivation of the function, a curve for the voiding rate is obtained. The apparatus comprises the following parts: container, mechanicoelectrical transducer, amplifier, derivation unit, calibration device, and an oscillograph with a photokymograph. Using this apparatus for the measurement of pressure, the author obtained curves showing the volume of micturition as a function of time. An addition to the apparatus permits this function to be derivated to give the record of the urinary volume passed per unit of time (voiding rate). A report of such recording in a series of urethral stricture cases is given.

The chief symptom of constriction of the urethral lumen is a greater or lesser impediment to the urinary flow. An accurate estimate of the degree of impairment is important for the estimation of the improvement of the flow to be obtained by dilatation of the constriction. The series comprised patients with urethral stricture treated at the Urological Unit during the latter part of 1956 and 1957. A total of 41 patients in whom the main diagnosis was stricture was examined with 111 micturition analyses. Twelve of the strictures were traumatic, 27 postinfectious, and in 2 cases, neither trauma nor infection was recorded in the history. Hyperplasia of the prostate coexisted in 9 patients, and in 13 instances the stricture was accompanied by other diseases of the urinary tract (prostatitis, sclerosis of the bladder neck, stone, and renal infections).

The curve for flow in normal males has previously been reported. In the first article the apparatus is described and pictured. There are numerous illustrations of these curves and the mathematics used in statistical evaluation of the material.

Clinical experience suggests that an objective recording of the volume voided per unit of time during micturition in patients with constrictive lesions of the urethra shows a decreased flow and a slower course of micturition. The analysis fully confirmed this assumption. The detrusor, being a smooth muscle, would also be expected to permit the maintenance without noteworthy fatigue of contraction throughout the period necessary to empty the bladder in the presence of stricture. This was confirmed by the plateaulike configuration of the curves characteristic of the majority of stricture cases. The height of the horizontal segment of the derivated curve above the zero line would then represent collectively the urethral resistance and the intravesical pressure.

The present study, in close agreement with clinical experience, suggests that instrumental dilatation of short strictures gives an immediate and fairly long-lived effect, whereas the long strictures do not respond so favorably to the treatment and relatively soon deteriorate again.

The dilatation of strictures with sounds is frequently performed at arbitrary intervals and the patient may have to wait so long for treatment that instrumentation presents technical difficulty. Other patients may well receive their urethral dilatations before they are necessary. Micturition analysis should be of aid in this connection.

If the curve shows the characteristic plateau configuration, the probable diagnosis is constriction of the urethra and the degree of severity can be assessed by the intensity of the flow. Differentiation of stricture from other conditions impeding urination, such as prostatic disorders, neurogenic bladder, inflammatory conditions in and around the posterior urethra, also appear by this method to give curve configurations so characteristic as to constitute a diagnostic aid.

In summary, the author concluded that in a series of 41 patients who had urethral strictures, his method of analysis of micturition flow produced a character-

istic plateaulike curve in the presence of urethral constriction, its height above the zero line indicating the severity of the stricture. The maximal flow was significantly lower in the present series of stricture patients than in normal persons. The method was found to be of value in diagnosis and in assessing the effects of different therapeutic measures.

—*Conrad A. Kuehn, M.D.*

Cancer of the Penis: A Clinical Study of 229 Cases. T. Ekström and F. Edsmyr. *Acta chir. scand.*, 1958, 115: 25.

The primary aim of this study was to evaluate the results of treatment of carcinoma of the penis (excluding carcinoma of the urethra and basal cell carcinoma of the skin of the penis). For this purpose the records of 229 cases of histologically verified carcinoma of the penis were studied and determinations of 5 year survival were possible in 194 cases.

Treatment of the primary tumor consisted of amputation of the penis 2 cm. below the tumor. If the primary tumor was so large that amputation would result in a very short or no penile stump, total extirpation of the penis and perineal urethrostomy was advised. In cases in which there was no clinical suspicion of inguinal metastases the lymph nodes were not extirpated. Instead, the inguinal regions were irradiated after removal of the primary tumor. As a rule, fractionated telegamma treatment was given, the total dosage being 3,000 to 4,000 roentgens to each of two fields in each groin. In some patients who at first were thought to be free from metastasis, subsequent clinically suspected or diagnosed inguinal metastases were extirpated at varying intervals after treatment of the primary tumor and prophylactic inguinal radiation. Inguinal node dissection was performed at or shortly after penile amputation when there was a strong clinical suspicion of metastasis. Only occasionally was local excision or contact roentgen therapy employed.

Insofar as prognosis was concerned, the factor of cardinal importance was the presence or absence of metastasis. Metastases were noted in 32 per cent of cases in this series and occurred more frequently in patients younger than 40 years. Neither the size of the primary lesion nor the duration of symptoms prior to diagnosis appeared to bear a relationship to metastasis. Insofar as site was concerned, carcinomas of the prepuce produced fewer metastases than carcinomas of the glans. The incidence of metastasis was higher in those cases in which the carcinoma was less differentiated as determined by histologic study.

One hundred and seventy-seven patients of the total group of 194 patients did not have metastasis, and the 5 year survival was 80 per cent. The 5 year survival for 67 patients with metastasis was 37 per cent. The absolute 5 year survival for the entire series was 65 per cent.

The authors suggest that penile amputation is adequate surgical treatment for carcinoma of the penis. They advocate local excision of the preputial cancer, but advise against such treatment if the lesion involves the glans. Inguinal node dissection is advisable only in the presence of clinical suspicion of metastasis, therefore the results of this study do not support the contention that primary extirpation of lymph nodes should be routinely undertaken in cancer of the penis.

—*Laurence F. Greene, M.D.*

GENITAL ORGANS

Views on the Value of Urethrocystography in Determining Indications for Surgery in Prostatic Hypertrophy. Hans Ekman. *Acta chir. scand.*, 1958, 115: 18.

Urethrocystography is now being performed in many centers in the routine investigation of patients who are being evaluated as possible candidates for prostatic surgery. The aim of the author's study is to determine the value of this procedure, complemented with cystoscopic findings, as an indication for surgical treatment. The study is based upon 370 cases of prostatic hypertrophy treated by transvesical or retropubic prostatectomy. The relationship of pathological changes in the bladder wall to dilatation of the upper urinary tract in prostatic hyperplasia is discussed.

Although a normal urogram is important, it does not always give adequate information to determine the need for surgery in the individual case. It is the consensus that prostatectomy should be performed before dilatation of the upper urinary tract has occurred. Therefore it is desirable to know if, despite normal intravenous urograms, there is a fairly immediate risk of such dilatation. Intravenous urography does not usually provide definite information in this respect. Cystourethrography, on the other hand, however reveals bladder lesions, such as trabeculations, diverticula, and thickening of the bladder wall. Cystoscopy permits detection of trabeculation and diverticula, but when the diverticula are fairly large, their size and extent are not clearly determined. Cystoscopic examination of the bladder does not permit estimation of the bladder wall thickness. To assess the significance of pathological changes in the bladder as an indication for surgery in prostatic hyperplasia, it becomes necessary to mention the causes of ureteral and pelvic dilatation and also the changes in the urograms which may be considered precursory to ureteral dilatation and therefore provide some evidence of this early stage. While the essential mechanism of ureteral dilatation is unknown, the older view that pressure by the adenomatous prostatic tissue on the intramural portions of the ureters is probably not applicable in most cases. Henningsen (1936) believed that the reason for dilatation was an altered tonus in the bladder wall.

Urinary infection must affect the ureters directly and also indirectly by producing changes in the wall of the bladder.

The author concluded that there is a parallelism between the degree of roentgenographically demonstrable changes in the bladder wall and the frequency of dilatation of the upper urinary tract. Prostatectomy should preferably be carried out before the upper urinary tract has become dilated. Then perhaps the operation may be called "early." So that it may not be "too early," some guidance may be obtained from urethrocystography and cystoscopy. When the bladder wall is smooth and even, immediate prostatic surgery is not indicated for preservation of the upper urinary tract. If, however, there is severe bladder trabecula-

tion, but no ureteral dilatation, prostatectomy may be considered to be urgently advised because of the risk of dilatation of the upper urinary tract. Especially if infection supervenes in a severely altered bladder, the risk is appreciably heightened. In slight (or moderate) trabeculation without dilatation, other factors, such as the age of the patient, his life expectancy, general health, and subjective and objective manifestations of the disease, are important considerations in preoperative assessment.

In this study, 14 of 127 patients with slight bladder wall changes had beginning or established ureteral dilatation. Thus, it would seem that even slight to moderate bladder trabeculation is an important and serious finding that strongly suggests surgery, provided the contraindications are not too definite.

On the basis of the changes in the urinary bladder disclosed by preoperative urethrocystography of 188 patients who also had intravenous urograms, 25 of the patients had the most severe bladder changes, trabeculation, and diverticula, and 16 or (64 per cent) had dilatation of the upper urinary tract. Of the 127 men with less pronounced trabeculation, 14 (11 per cent) showed some dilatation. The difference was considered statistically significant.

Three of the 30 patients with dilatation of the upper urinary tract and bladder lesions had less than 100 ml. of residual urine. The changes in the bladder wall would seem to constitute one of the surest and most objective signs of bladder emptying associated with prostatic hyperplasia. Preoperative cystourethroscopy or cystoscopy must be ascribed particular importance in diagnostic investigation and in assessing the indications for surgical intervention.

—Conrad A. Kuehn, M.D.

MISCELLANEOUS

Genitourinary Focus in Rheumatic Disorder in the Male. Britta Domeij, Gustav Giertz, Börje Olhagen, and Ragnar Romanus. *Acta chir. scand.*, 1958, 115: 1.

The authors present a study of 190 male patients with various rheumatic disorders who underwent urologic investigation. The rheumatologic diagnoses were ankylosing spondylitis, rheumatoid arthritis, postinfectious polyarthritis (Reiter's syndrome, postgonorrheal arthritis, rheumatic fever, and arthralgiae myalgiae). The urologic investigation included palpation of the prostate and seminal vesicles, as well as cytologic and bacteriologic examination of the material expressed from these glands. A control series of 66 males without rheumatic disorders were examined.

The pathologic changes found by urologic investigation were noted chiefly in the seminal vesicles and were divided into three main groups: endovesicular, perivesicular, and a combination of the two. In the endovesicular type the pathologic process was situated in the vesicles themselves, which were felt either as palpable masses separated from the prostate or lying close against the base of that gland. In the perivesicular type the base of the prostate was blurred and the superior portion of the gland merged diffusely and without contours with a more or less firm infiltrate extruding from one pelvic wall to the other.

Chronic inflammatory changes of the prostate and seminal vesicles, with or without signs of activity, were demonstrated in one-third of the control group, in more than half of the patients with rheumatoid arthritis, in 85 per cent of those with postinfectious arthritis, and in 97 per cent of patients with ankylosing spondylitis. The authors suggest that the prostatic and vesicular disease may be part of a systemic mesenchymal disorder and appears to have a causal relationship to rheumatic disorders.

—Laurence F. Greene, M.D.

Experimental Urolithiasis in Rat with Foreign Body in the Bladder, and Role of Infection in its Production. H. S. Chakravarti and Renuka Banerjee. *J. Urol.*, Balt., 1958, 79: 785.

The authors repeated experimental work done by other investigators, in which a piece of zinc was placed surgically into the urinary bladder of a rat in order to promote stone formation upon the zinc. The authors believed that the role of induced bladder infection as a cause of stone formation in these studies had not been taken into account. They repeated the experiments but utilized strict asepsis during the operation and administered penicillin and streptomycin parenterally; finally, the urine pH and surface tension were studied.

In the control group the pH varied from 7.2 to 7.8; in the group treated with antibiotics, the pH varied from 6.2 to 7.2 only. Since the rat diets were identical, only the infection caused the urine alkalinization in the control group. Surface tension did not vary between the two groups.

The authors believe that associated infection is the main factor in the formation of stone when zinc is introduced in the bladder of experimental animals. If the infection can be controlled, stone formation can be prevented. Finally, they believe that the introduction of zinc into the bladder with aseptic precautions is not an effective method of producing lithiasis experimentally.

—David Rosenbloom, M.D.

Male Subfertility; Treatment with Liothyronine (Cytomel). D. Cramer Reed, William H. Browning, and Harold F. O'Donnell. *J. Urol.*, Balt., 1958, 79: 868.

In the plasma of normal and hyperthyroid patients, but not in the plasma of hypothyroid patients, is a substance called liothyronine with a chemical action that is related to thyroxine but is stronger biologically, both starting and stopping more promptly than in response to thyroxine. In addition to its success in the treatment of hypothyroidism and simple (nontoxic) goiter, it also has been known to increase the number and speed of spermatozoa in subfertile men.

The authors used the term "oligospermia" with reference to patients with fewer than 80 million spermatozoa in their entire ejaculate, and the term "fertile" to patients with sperm counts of 80 to 185 million. Forty-five men who were shown by semen analyses to be oligospermic were treated with liothyronine. The semen analyses of all 45 patients showed that the semen was deficient in the number of spermatozoa and the speed of the latter was decreased.

A therapeutic regimen consisted of an initial dose of one 5 mcgm. tablet each day with a gradual increase

to a maximum dosage of 15 mcgm. daily, depending upon the individual's response. Treatment in the series ranged from 3 to 26 weeks. Semen analyses were made prior to therapy and periodically during medication, each test being performed after the patient had been abstinent for 5 days.

Of the 45 patients studied, 24 were treated for deficiencies in both number and speed of the spermatozoa. Fourteen of these patients were benefited with regard to both of these factors, while 10 with regard to one factor without significant change in the other. Four patients showed no significant change in either factor, and 4 actually revealed a decrease of the factors. The 4 patients who were treated for a deficiency in the number of spermatozoa were benefited, and 3 showed improvement in the speed of their spermatozoa. Of the 45 who were classified as subfertile before therapy 12 attained a relatively fertile category, and 6 attained a level of high fertility. Conceptions were reported among the wives of 8 of these 18 men.

In this series of patients 69 per cent of the subfertile oligospermic men were benefited by liothyronine therapy. While this improvement of spermatogenesis with small doses of liothyronine is significant, nonetheless, additional research in this direction is indicated. —*Peter L. Scardino, M.D.*

A Clinical Contribution to the Problem of Hermaphroditism (Klinischer Beitrag zum Zwitterproblem). Rütger Hasche-Klünder, Heinz Gelbke, and Hans-Ulrich Anton. *Zschr. Urol.*, 1958, 51: 270.

Hermaphroditism and pseudohermaphroditism occur very infrequently. Neugebauer and Young estimate the incidence to be about 1: 1000. Accounts of these deformities in the literature do not always give a clear and detailed description, so that it is often difficult to ascertain whether the case reported is that of a true or pseudohermaphrodite.

Overzier has been able to collect only 74 true cases of hermaphroditism from the literature. True hermaphrodites are individuals who have both a testicle and an ovary. If the gonads are either completely male or female and the sex organs do not precisely correspond to the sex indicated by the gonads, the individual is considered to be a pseudohermaphrodite.

It is very important to establish the true sex of a newborn child whose genitalia are deformed to the extent that simple recognition of the gender is not possible by inspection alone. A wrong decision on the sex involved will eventually lead to psychic and sociologic difficulties which can become quite serious after puberty.

Hermaphrodites usually do not have fully functioning testicles or ovaries as determined by the histologic examination of the sex organs. Even true hermaphrodites tend to assume the role of a specific sex and are apt to consider themselves either as a male or as a female. Environment, education, and habit can influence a hermaphrodite to assume one particular sex pattern.

Newborn infants whose sex cannot be readily determined are better brought up as boys rather than girls, since pseudohermaphrodites more frequently have male rather than female gonads. The incidence of male in proportion to female pseudohermaphrodites is given variously as 9 to 1 or 12.5 to 2.5.

Cryptorchidism, hypospadias, hypertrophy of the clitoris, and persistence of a urogenital sinus may make the determination of the sex in an individual case extremely difficult. To establish the true sex of the patient it may be necessary to do a thorough urologic investigation; a laparotomy, in order to obtain a biopsy specimen of the intraperitoneal gonads; and an estimation of the excretion of 17 ketosteroids in the urine with chromatographic differentiation of various gonadotropins, in addition to the more recent tests of establishing the true sex of the individual through the study of the chromosomes in the leucocytes. In the differential diagnosis, the adrenogenital syndrome and gonado-agenesis must be considered.

The management of hermaphrodites and pseudohermaphrodites depends not only on the anatomic and endocrine findings but, also, on the psychic and sociologic factors involved in a given case. Surgical corrections of true hermaphrodites should be undertaken before they become adults. Plastic procedures to relieve hypospadias or downward curvature of the phallus may be necessary. In some patients the size of the clitoris must be reduced and vaginal plastics may be indicated. Since malformed gonads may undergo malignant degeneration, it is wise to continue clinical observation of patients in whom the correct diagnosis of sex has been made.

The difficulty in the diagnosis and management of true and false hermaphrodites is illustrated in the 7 case reports included in the text.

—*S. Richard Muellner, M.D.*

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Bone and Joint Changes in Hemophiliacs. GABRIEL STIRIS. *Acta radiol.*, Stockh., 1958, 49: 269.

THE AUTHOR presents a study of 35 cases. Thirty of these patients showed signs of articular hemorrhage. The youngest patient was 3 and the oldest was 71 years of age. Ordinarily the initial hemorrhage in the joint followed a fair degree of trauma. The hemorrhages subsequently recurred with very slight trauma and in some cases without external influence.

Twenty-nine of the 30 cases had clinical or roentgenographic changes in two or more joints.

The knee joint was by far the most commonly affected, followed by the elbow joint and the ankle. Less frequently the wrist was involved, and rarely, the shoulder, hip, finger and toe joints.

Twenty-eight of the patients had clinical changes in one or more joints with deformity, malposition, contracture, and reduced mobility. There was also marked muscular atrophy.

The most characteristic roentgenographic findings were erosion and cyst formation. Cysts occur in the region of the joint, vary in size, and are mainly situated in the epiphysial area.

Deformity is most frequently found in the knee and elbow joints.

The tourniquet test was negative in all cases except one. —*Richard J. Bennett, Jr., M.D.*

The Surgical Management of Chronic Tophaceous Gout. WILLIAM A. LARMON and JAMES F. KURTZ. *J. Bone Surg.*, 1958, 40-A: 743.

THE RESULTS of and experience with, 29 various surgical procedures on 23 patients with gouty tophi are presented. Clinically, tophi occur as a late manifestation in 10 per cent of gouty patients who have a severe form of the disease. The total amount of freely diffusible uric acid (metabolic pool) is 700 to 1,400 milligrams. The rate of formation and excretion (turnover) varies in the normal from 0.5 to 0.9 metabolic pool per day. In the gouty patient this runs from 0.35 to 0.5 pool per day. The total pool is 2,000 to 5,000 milligrams in the gouty patient. If the kidneys are functioning normally, the pool may be decreased by constant therapy with renal tubular blocking agents (uricosuric agents), and Gutman and Yu have demonstrated a decrease in the tophi on such a regimen.

The tophi affect the skin, subcutaneous tissue, bursae, tendons, bones, and joints. The site of involvement is usually in the extremities distally, but the other extremity joints may be involved as well with a prediliction for the extensor surfaces.

The skin may be involved as a dermatitis appearing as white frosted areas or more commonly, may involve the deeper layers. In the subcutaneous tissues the lesions were encapsulated. These were lobulated and contained masses of sodium urate. In constricted areas these may infiltrate outside the capsule, as in the fingers and toes.

The bursae contained the sodium urate confined in separate compartments, usually in a semiliquid state. The walls may be greatly thickened with separate tophi in an inspissated state. In the tendons the deposits were infiltrative, resulting in a fusiform nodular appearance of the tendons interfering with gliding action.

Joint lesions consisted of a direct deposit of crystals on the cartilage and destructive pannus formation. Pannus may destroy the cartilage by invasion from the margins or may destroy the underlying bone. Urate may be deposited directly in the bone, destroying the trabeculae. The joint is usually destroyed and deformed which at times leads to bony ankylosis.

Lytic lesions may occur in the shaft of bones from the direct deposition of crystals in the haversian system. Radiologically, there is minimal surrounding sclerosis of an expansile lytic lesion.

Microscopically, in early soft tissue lesions there is a central area of crystals and necrotic tissue surrounded by an inflammatory wall of lymphocytes, monocytes, multinucleated giant cells, and polymorphonuclear leucocytes. Peripheral to this is a fibrous stroma forming the capsule. Enlargement occurs by the peripheral deposition of urates and by invasion of the surrounding tissues. The urates may be in a liquid but they are usually inspissated, chalky deposits. The chemical composition of the deposits was studied and they were seen to contain many elements besides uric acid.

Tophi in the skin and underlying tissue may cause necrosis because of encroachment and pressure on the blood supply. This is even more evident in cases with arteriosclerosis which frequently accompanies the disease. Normal skin can tolerate an extensive buildup of deposits because of its increased blood supply. Ulceration with acute necrosis may resemble cellulitis with erythema and induration. With sloughing, there is a discharge of urate crystals and the ulcer becomes indolent. Urates which make up the base of the ulcer are constantly discharged with serosanguineous to purulent matter. Usually the ulcer granulates in from below, but occasionally it may remain inactive with subsidence of induration and epithelialization at the margins, with only an exposed deposit of sodium urate remaining. It was rare to find secondary infection despite the presence of normal skin organisms, the tophi apparently having some limiting effect on bacterial growth and invasion.

The indications for surgery are as follows:

1. Unsightly tophi.
2. Pain in exposed bony areas (olecranon) or in the hands or feet.
3. Interference with tendon motion.
4. A discharging tophaceous sinus.
5. For the prevention of sinus formation when there is marked distention and threatened necrosis of the skin.

6. For decreasing the total urates in the body, by removing large readily accessible deposits.

7. Joint surgery to correct deformity and improve function, by resection or arthrodesis or simply by removal of tophi.

8. To decompress nerves, as the median in the carpal tunnel.

There were a total of 99 operations on 23 male patients varying in age from 36 to 76. The majority of tophi involved the subcutaneous tissue, tendons, bursae, joint capsules, cartilage, and bone. Six resections of the joints were done and one hip prosthesis. Five joints were fused. There were 2 cases in which the median nerve was decompressed in the carpal tunnel.

Surgical technique involved consideration of the blood supply in exposure and removal of the tophi. In the closed cases, incisions must be placed to avoid interference with the blood supply in an area where it is already compromised. A pneumatic tourniquet was used in the upper extremities, but not in the lower extremities or about the bases of fingers or toes. Flaps could be used in the hand, wrist, or foot and ankle when the skin and subcutaneous tissue were adequate. In the fingers and toes the incisions on the dorsum should be transverse and over the area of maximum pointing. Longitudinal incisions should not be made unless they are lateral and carefully avoid the neurovascular bundle. Sharp dissection should be used with the blade directed against the deposit. All crystals should be removed as they act as foci for new deposits. Irrigation to remove all crystals and prevent drying out was done in all cases. Gentle retraction of the skin flaps is very important as the blood supply has already been endangered.

In bone and cartilage thorough curettement with minimal dissection of soft tissue should be done, the bone being entered through the area of pointing of the tophus. Resection of certain joints, such as the great toe (Keller procedure), radial head, distal ulna, as well as the proximal phalanges of the toes, can be done.

In the upper extremity the hand must be carefully splinted to preserve functional positioning. All vital structures must be preserved and motion retained. In the lower extremity, flexible but stable weight bearing is essential, and not dexterity. Fusion was done about the ankle and subtalar joints with good results.

Primary closure with pressure dressings was done in all closed cases. Sepsis did not occur except where there was necrosis of the skin. Suturing should be minimal to allow for drainage.

Ulcers of the skin may be operated on when they have become indolent. Healing depends on the complete discharge of urate crystals, which may be helped by surgery. The deposit should be approached through the base by enlarging the ulcer with a transverse incision because parallel incisions cause slough of the intervening skin. The wounds were packed open and gradually healed.

Preoperative and postoperative care consisted of probenecid (0.5 to 3.0 gram per day during the hospital stay), together with colchicine (1/120 grain three times a day 3 days before and one week postoperatively). This has minimized postoperative attacks of gout.

Of the 23 patients, 4 died and 5 have been lost to follow-up. The remaining 14 have had no recurrences of tophi for periods varying from 6 months to 6 years. In the patients with recurrence, there had been incomplete removal of the tophi or the patient did not use, or benefit from the use of, probenecid.

—*Richard G. Saxon, M.D.*

Legg-Calvé-Perthes' Disease. David L. Evans. *J. Bone Surg.*, 1958, 40-B: 168.

Of 200 patients with Perthes' disease treated during the past 10 years only 52 could be traced for reevaluation. The ratio of male to female was three to one. The age of the patients varied from 3 to 14 years with the average age being between 5 and 8. The average duration of clinical symptoms before treatment was begun was 6 months. Bed rest was used for 2 to 24 months followed by the wearing of a caliper.

Most patients had no symptoms; 5 showed limping, 27 shortening, and 31 quadriceps atrophy. Most commonly restricted were abduction (17), lateral rotation (17), extension (13), and medial rotation (10).

Some femoral heads were enlarged and the subluxation described by Waldenström as an early radiographic feature of Legg-Perthes' disease was seen in 42 hips. Out of 39 hips, an increased anteversion angle was found in 31. The patients with a well shaped femoral head usually had no pain and almost complete mobility, while those with a fair head had some pain and restricted motion as a rule.

As factors influencing the prognosis the following observations are cited: If the age of onset was over 8, the result was always poor; it also appeared that the prognosis in girls is worse, a finding that may be related to their earlier skeletal maturation. The cycle of epiphysial changes, increased density, flattening, fragmentation, and restoration, is a well known characteristic feature. The first evidence of flattening is found on the superior lateral surface in the anteroposterior view. Surgery consisting of drilling and tibial grafting seems to hasten the revascularization; however, the number of cases is too small for evaluation.

Roentgenographic evidence of degenerative arthritis was present in all patients with poor hips. Of the 52 patients the femoral heads were good in a third, fair in a third, and poor in a third. The function was usually good, except in the patients who had marked deformity of the femoral head.

—*E. H. Bettmann, M.D.*

Prognosis in Osteogenic Sarcoma. Mark B. Coventry and David C. Dahlin. *Rocky Mountain M. J.*, 1958, 55: 45.

Most of the previously reported data on prognosis in cases of osteogenic sarcoma have been based on rather small series of patients and are not statistically significant. The authors have studied all bone tumors seen at the Mayo Clinic from 1909 through December, 1955. There were 490 osteogenic sarcomas in the entire series of 2,276 pathologically verified tumors. Excluding myeloma, osteogenic sarcoma is the most commonly seen malignant tumor of bone. The well differentiated osteosarcoma (of which there were 21), that is characteristically juxtacortical or parosteal in location, has been eliminated from consideration in

this series. Parosteal sarcomas are indolent and of low-grade malignancy, and carry a much better prognosis than do ordinary osteogenic sarcomas. Also, 39 osteogenic sarcomas of the jaws have been eliminated because of their special clinical and therapeutic problems.

Of the remaining 430 cases of osteogenic sarcoma, a 97 per cent follow-up has been achieved.

The most common site of the tumors was the metaphysial ends of the long bones. The region of the knee was the site of more than 50 per cent of the tumors. Forty-seven per cent of the patients were in the age group of 10 through 19 years. Males comprised 63 per cent of the patients. The 5 year survival rate (353 patients) was 19.3 per cent and the 10 year survival rate (294 patients) was 15.3 per cent.

Most patients underwent amputation, which was the definitive form of therapy in all but 7 of the 68 patients who survived 5 or more years. Radiation therapy was given alone and in conjunction with surgical measures. It was the definitive form of therapy for about one-fifth of the tumors, a group composed chiefly of lesions not amenable to surgical ablation. Two patients treated by radiation alone have lived 32 and 19 years respectively. In 5 instances grossly complete excision of tumor followed by radiation resulted in 5 year survival. Of the 4 per cent of the entire series who died between 5 and 10 years after diagnosis, most succumbed to the effects of their tumors. Prognosis is much more favorable when the tumor is amenable to radical surgical treatment than when it is not. The 5 and 10 year survival rates for tumors located below the upper end of the femur were 22.8 and 17.6 per cent respectively. The 5 year survival rate for patients who had sarcoma of the tibia was 34.6 per cent, compared with 17 per cent for those who had a femoral tumor.

Early surgical ablation is the most successful treatment. The affected extremity is amputated at once after the correct diagnosis has been established. In suspected cases of osteogenic sarcoma of the extremities, two tourniquets are applied, one above the tumor and one above the proposed site of amputation. After the diagnosis has been established by frozen section examination, amputation is performed between the tourniquets. This procedure precludes possible dissemination of tumor emboli by the biopsy. Practically all osteogenic sarcomas have soft parts that can be readily diagnosed by the fresh frozen-section technique.

—Bernard C. Gerber, M.D.

Nonspecific Synovitis (Sinovitis inespecificas). A. Castillo Ojugas. *Rev. ortop. traumat.*, Madrid, 1958, 2: 182.

Nonspecific synovitis is defined as a chronic process in which the synovial membrane reacts by infiltrative or proliferative changes to such stimuli as trauma, a foreign body, or immobilization. The histological picture lacks a specific character; in each instance it is made up of a combination of infiltrative, proliferative, fibrotic, and degenerative features in various proportions. Three general types are defined.

1. Simple hypertrophic villous synovitis. There are three subtypes: infiltrative, vascular, and fibrous, according to the predominant element seen histologically.

In the first of these subtypes, the knee is the most commonly affected joint. The history is of gradual swelling, or sometimes sudden swelling, after injury. Pain and stiffness are not conspicuous. Rheumatoid arthritis commencing in a single joint is a special finding in this type, as is intermittent hydrarthrosis, which the author considers an atypical form of rheumatoid arthritis.

The vascular subtype almost always follows trauma. It is thought to be a process intermediate between the simple villous synovitis and pigmented villonodular synovitis.

The fibrous subtype often is the result of an old meniscus tear.

2. Lipomatous synovitis. Again three subtypes are recognized: hypertrophy of the retropatellar fat pad, solitary synovial lipoma, and a generalized form (arborescent lipoma). Trauma is an important etiological agent.

3. Pigmented villonodular synovitis. The author described the familiar clinical and histological features, and advocates that in this group be included ailments formerly known as xanthoma, xanthogranuloma, and giant cell fibrohemangioma. There are two forms: the localized, with single or multiple focus, and the diffuse or generalized type.

—Charles T. Ryder, M.D.

Symmetrical Lipocalcinogranulomatous Bursitis (Borsite lipocalcinogranulomatosa simmetrica). Matteo della Corte. *Gior. ital. chir.*, 1958, 14: 352.

The author reviews the previously reported 15 cases of symmetric lipocalcinogranulomatous bursitis and describes in detail the clinical, radiographic, and pathologic findings in a 20 year girl afflicted with this condition. The disease involved both the gluteal and trochanteric bursae bilaterally. Two of this patient's sisters suffered from the same pathologic condition, thus confirming its familial and constitutional basis.

The author believes, from the histopathologic evidence, that this syndrome does not constitute a nosologic entity but rather that it is a variety of progressive calcareous bursitis. *—A. Wiener, M.D.*

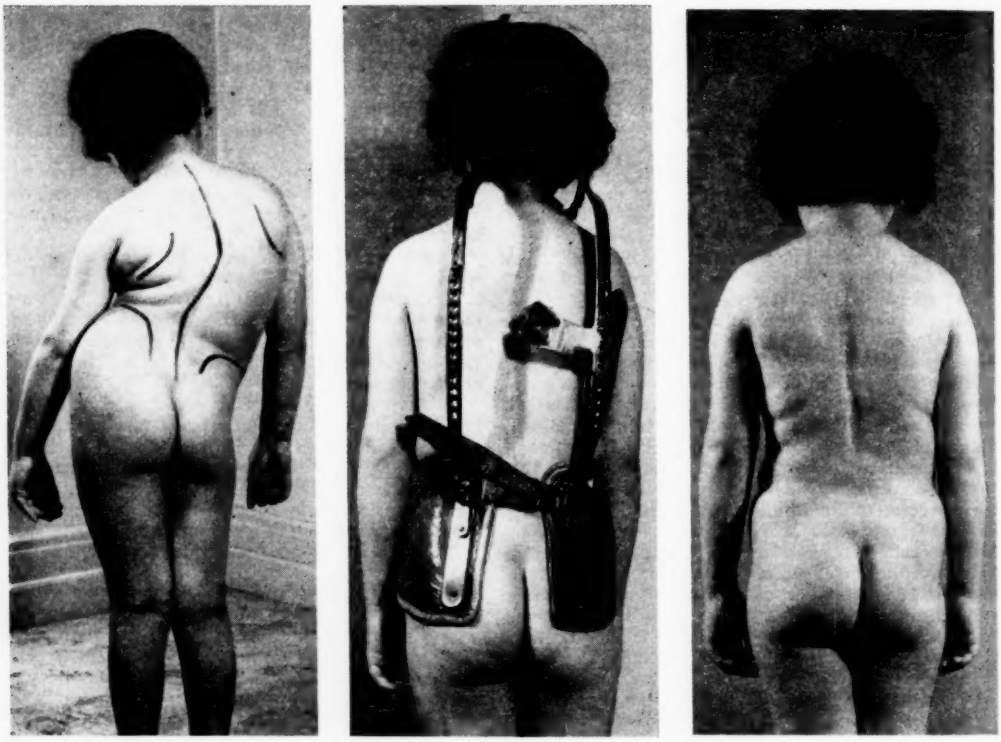
Mediastinal Pleuritis in Children and Scoliosis (Pleuritis mediastinalis im Kindesalter und Skolioseneentstehung). G. Jentschura and F. Schmid. *Zschr. Orthop.*, 1958, 90: 19.

Recently Reske advanced the theory that the process which produced the paravertebral shadows, which were first described by Kankeleit in 1918, was the cause of scoliosis. To test this theory, the authors studied cases of mediastinal pleuritis to determine whether scoliosis was present.

In 76 of 101 children, with mediastinal pleuritis, between 2 weeks and 15 years of age, no curvature was found, a curvature which disappeared later was found in 22, and a true curvature of the spine was found in 5. But in only one of these 5 patients was there a definite connection between the pleuritis and the scoliosis.

The authors conclude that there is no basis for Reske's theory that the process which produces a paravertebral shadow is the cause of scoliosis.

—J. C. Mulier, M.D.



a b c

FIG. 1 (Blount). a, A girl, 5.5 years old, with a decompensated right convex curve which followed poliomyelitis at age one. There is thoracic lordosis. b, The patient started walking in the brace 4 months after fusion of the spine. Much of the thoracic lordosis has been corrected by the operation and the distraction of the brace. The outrigger is used to direct the force of the pad medially without any component in the forward direction. The girdle has spread to allow for enlargement of the pelvis. c, Ten months after the spine fusion. A follow-up examination one year later showed the same appearance.

The Milwaukee Brace in the Operative Treatment of Scoliosis. WALTER P. BLOUNT, ALBERT C. SCHMIDT, E. DUDLEY KEEVER, and EUGENE T. LEONARD. *J. Bone Surg.*, 1958, 40-A: 511.

THE AUTHORS discuss the role of a special brace used in conjunction with the operative treatment of scoliosis. This brace was developed as a refinement of the distraction plaster jacket, and may be used, with suitable modifications, in the improvement of almost any spinal curve. The services of a capable and cooperative bracemaker are essential. The essential metal parts, except for the pelvic girdle, are prefabricated in the interest of economy. The pelvic girdle must be molded for the individual patient and must be remade when the patient's weight changes and sometimes after partial correction of the deformity.

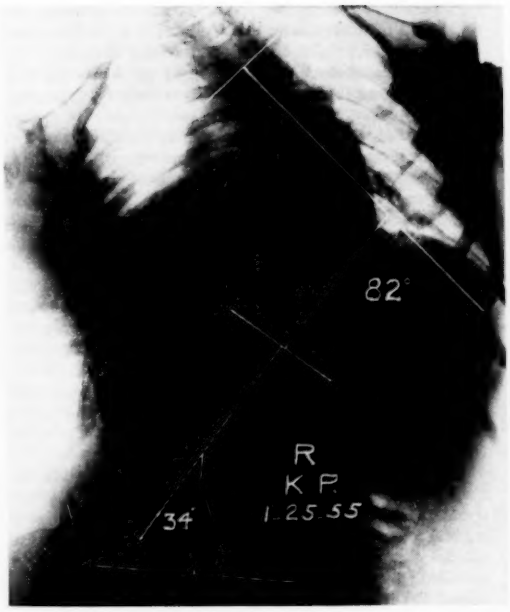
The brace should be used sparingly in the nonoperative treatment of scoliosis and then only in three clearly defined situations:

1. It should be used when the existing idiopathic deformity is still acceptable in an adolescent near the end of the growth period. If a curve progresses while the patient is ambulatory with a Milwaukee brace, it should be fused.

2. In a few convalescent poliomyelitis patients with functional or very early structural scoliosis, the Milwaukee brace has aided in reducing the curve and holding it in check until muscle balance has been reestablished.

3. In patients with chronic poliomyelitis and abdominal weakness, the brace has been found most efficient in the conservative treatment of scoliosis combined with pelvic obliquity.

As an adjunct to surgery, the patient wears the brace before operation only long enough to become accustomed to it, usually one to three weeks. Most of the correction of the resistant curves is accomplished after surgery when contracted muscles and ligaments have been removed, and osteotomy of congenital bars of bone has been done. When the contact areas are



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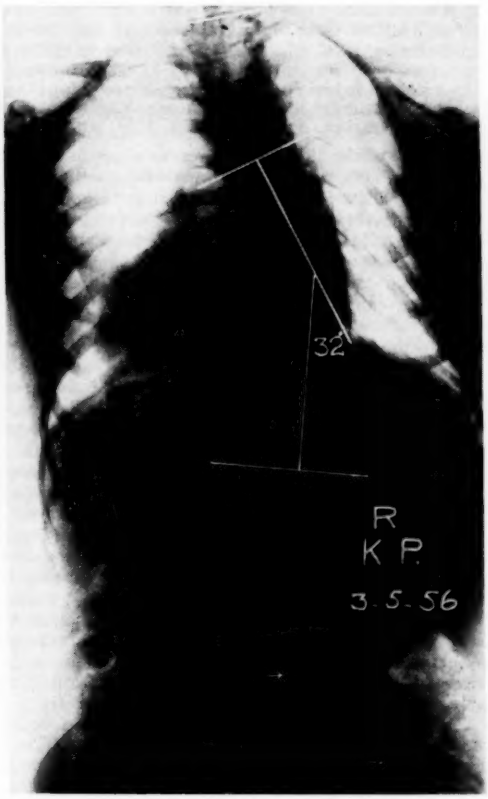

e

FIG. 1 (Blount). d, A roentgenogram made with the patient standing shows a markedly decompensated right low thoracic curve of 82 degrees with early structural changes. Application of the Milwaukee brace only partially corrected the curve. e, A roentgenogram made with the patient standing shows the correction of the major curve to 32 degrees after fusion and postoperative fixation with the Milwaukee brace. The solid column of bone from the first thoracic to the third lumbar vertebra is identified by markers. Note that there is an increasing shortening of the right leg. The length will be equalized early, after eight years of age.

accustomed to pressure of the brace the patient is admitted to the hospital, at least 2 days before surgery.

In the operative fusion of a scoliotic spine the following points are of great importance:

1. The incision must be along a straight line between the spinous process of the seventh cervical vertebra and the midsacrum.
2. Accurate identification of the level is imperative; it should be done in the operating room by means of a marker and roentgenograms.
3. Subperiosteal exposure of the spine should be carried laterally as far as the cartilaginous caps on the thoracic transverse processes.
4. All of the articular facets must be fused.
5. Cancellous bone must be exposed over the stumps of the spinous processes, laminas, and thoracic transverse processes.
6. Autogenous bone is almost always added. The bone is best obtained from the ilium.
7. Shock must be prevented.
8. The fusion area must be carefully determined.

The orthopedist who is not thoroughly familiar with the treatment of scoliosis should start with the simpler cases and as he gains experience, undertake the more complicated ones. Consultations are desirable.

After completion of the fusion, the brace is reapplied. In the postoperative course the brace will require periodic adjustment to take up the slack. Symmetrical distraction should be used at all times. The pressure pad should be tightened as the spine is straightened. A girl of 14 years is kept recumbent for 5 months after the last operation. Younger children may walk after somewhat less time. After removal of the brace, the usual cause for an increase in the curve is pseudarthrosis. The defect may be localized clinically by tenderness and also roentgenographically. Pseudarthrosis should be identified promptly and repaired before the patient is permitted to walk. The brace should be worn constantly for 6 weeks or more after the patient is permitted to walk. It is first discontinued at night and then for increasing periods during the day. Later, it should be replaced by a corset for abdominal support. Additional rest will be necessary for several months.

There was a 39 per cent incidence of pseudarthrosis

in a series of 87 cases on which detailed results are given. Half of these were repaired and resulted in stable union. —*Bernard C. Gerber, M.D.*

Ligamentous Injuries of the Human Knee Joint (Die Bandverletzungen des menschlichen Kniegelenkes). ROBERT JELINEK. *Sportärztl. Praxis*, 1958, p. 23.

A REVIEW of the literature of recent years indicates that the diagnosis and therapy of ligamentous injuries of the knee joint is still not a closed issue.

The cruciate ligament injuries are the most severe of all of the ligamentous injuries in the knee joint. It requires the greatest degree of trauma to rupture a cruciate ligament. Approximately 10 per cent of the internal derangements of the knee joint are injuries of the cruciate ligament. Eighty per cent of the ruptures of the cruciate ligaments occur in the anterior cruciate ligament.

The diagnosis is always difficult, and in the first days after the injury may be almost impossible. The diagnosis is given in all text books as a classical triad: (1) hyperextensibility, (2) increased internal rotation, and (3) the drawer symptom. Other symptoms have been described; however, there is only one criterion for the diagnosis of rupture of the cruciate ligament and that is the drawer symptom. Other conditions which can produce a positive drawer sign include: loosening of the attachments of the cruciate ligaments, muscular weakness, atrophy of the thigh musculature, shortening of the femur after fracture, and atrophy due to poliomyelitis. The drawer symptom may also be present in normal healthy athletes, and in growing children. It is not considered significant unless the amount of motion exceeds 1 centimeter.

The diagnosis of an injury to the cruciate ligament is not sufficient indication for treatment. The amount of functional disturbance in the knee joint must also be evaluated by clinical tests, such as the stability of the knee joint when the patient walks downstairs. Arthrography has been found to give unreliable results in injuries of the cruciate ligaments. Mandl believes that it is important to distinguish between strains or partial tears of the cruciate ligaments and rupture of the cruciate ligaments. The author states that he observed no lesions of the cruciate ligaments without rupture and a diminution of the drawer symptom following procaine-autogenous blood injection and with this stabilization of the joint. In the cases without diminution of the drawer phenomenon after this treatment test, operation was carried out and usually a ruptured ligament was found. Strains of the cruciate ligaments are treated according to the recommendations of Mandl, with procaine-autogenous blood injection and physiotherapy, but ruptures of the cruciate ligament are operated upon.

Conservative treatment of rupture of the cruciate ligaments is objected to for a number of reasons. In the author's clinic the operative method of Hey-Groves is generally practiced with minor modifications. Because of the magnitude of the operative intervention, it should be undertaken only after the most careful consideration. The patient must be fully aware of the magnitude of the operation and be willing to provide active co-operation in the postoperative period. Five contraindications to the operation must be excluded prior to the procedure. These are: (1) a patient past 40 years of age, (2) heart or vascular damage, (3) acute inflammatory processes, (4) triviality of the patient's complaints, and (5) severe acute or chronic damage to the joint itself.

From 1947 to 1957, 40 patients with rupture of the cruciate ligaments were operated upon. In 7 of these patients a simultaneous plastic repair of the collateral ligaments was undertaken, and in 3 patients, ruptured menisci were also repaired. In 1954, 19 patients were followed up; these were operated upon using the technique of Hey-Groves. Thirteen good results were obtained and 2 patients were benefited. In 2 cases of direct suture of the ruptured collateral ligaments there was one good result and one poor result. In 2 cases of extra-articular plastic repair, there was one good result, and one patient was benefited. The operative treatment of cruciate ligament ruptures produces, in the majority of cases, a completely functional knee joint, and the treatment time is shorter than that for conservative treatment.

Collateral ligament injuries of the knee joint are, by far, more common than lesions of the cruciate ligament. They are injuries of less severity. Nevertheless, the disturbance which these injuries cause in the knee joint is considerable. This injury always occurs as a result of trauma against the side of the knee joint. With the foot fixed, the knee joint is forced medially or laterally, and the result is an overstretching of the ligament. The injury occurs predominantly in sports. The fall on the spread and externally rotated leg increases the valgus bending, and the medial collateral ligament becomes overstretched. Since lateral deviation is the injury which most commonly occurs, it is natural that the medial collateral ligament is the most frequently injured. Two injuries of the collateral ligament are distinguished. One is a lesion of the ligament without rupture; the other is a rupture of the ligament.

The injury which is referred to in the literature as "pulling or overstretching" of the ligament has been called a "lesion," since the lateral stability of the joint is not in any way influenced. On the other hand, in rupture of the ligament there is complete dissolution of the continuity of the ligament and the accompanying capsule, which leads to a severe disturbance of joint function. The differential diagnosis between collateral ligament injury and cruciate ligament injury is simple if a combination injury is not present. In lesions of the collateral ligament, motion causes a severe pain in the region of the ligamentous attachments. Usually on finger pressure, there is a tender spot along the band, which is most often at the upper femoral attachment of the band. Also abduction or adduction, depending upon whether it is a medial or a lateral ligament rupture, causes pain. In the ligamentous lesions a roentgenographic study should be made in order to rule out injury to the bone. An important diagnostic point in complete tearing of the collateral ligament is the possibility of moving the leg to the opposite side after the ligament has been anesthetized. According to the site of the rupture this will move into abduction or adduction. Deviation of as much as 30 degrees between the thigh and leg has

been observed in this injury. Roentgenograms of both knees should be obtained, since there is, particularly in the lateral ligament, a certain amount of stretchability, which may be as much as 3 to 4 mm. Arthrography is of value in cases of rupture of the collateral ligaments. The arthrogram may exactly pin-point the site of rupture by dissemination of the contrast material into the surrounding soft tissues.

The treatment of stretching injuries of the collateral ligaments without actual rupture should be conservative. Local anesthesia injected into the ligament will allow painless normal joint function. Massage of the collateral ligaments seems useless. More recently, hydrocortisone has been injected into the painful region in cases of pulling or overstretching of the collateral ligaments. This treatment seems to be of definite benefit. Fifty mgm. of hydrocortisone are injected after a local anesthetic agent has been infiltrated into the region. Usually, after the local anesthetic has worn off, there is a reactive increase in pain which lasts for 5 to 6 hours, but gradually subsides. The period of reactive increase in pain can be minimized by using local anesthetic agents which have a longer duration of action. The author has tried a newer method. In cases of injury to the collateral ligament without rupture of the ligament, after the painful area has been localized and anesthetized with 1 to 2 cc. of procaine, a reactive hyperemia is induced by puncturing the painful area one to four times with an electric needle. In all but 2 of 25 cases so treated the patients were completely free of pain on the following day. Although many authors believe that the treatment of rupture of the collateral ligaments should be conservative, it is felt that the operative intervention is to be preferred.

From 1947 to 1954, 32 patients have been operated upon. Good results were obtained in 26 cases. Five patients were benefited; there was no noticeable benefit in one. Sixteen additional patients were treated from 1955 to 1957 making a total of 48 in all. The latter group of cases has been evaluated only recently.

The results of the operations in these cases have been satisfactory but more recently the author has tried to bring about scar contracture of the band by needling of it, thus attempting to produce a simple method of healing of the ruptured collateral ligament. This method has not yet been employed long enough to be properly evaluated.

—Robert D. Larsen, M.D.

Adamantinoma of the Tibia (Sul cosiddetto adamantinoma della tibia). I. F. Goidanich and R. Venturi. *Chir. org. mov.*, 1958, 45: 177.

The authors define an adamantinoma as a neoplasm derived from residues of the dental enamel organ and usually arising from the mandible. It has a great tendency to recur after excision and may at times lead to metastases.

A careful review of the literature was made to study cases of extramandibular adamantinomas. The authors have found reports on 30 cases involving the tibia, one involving the femur, and one each the ulna and radius. So-called aberrant forms of this tumor have been observed in the hypophysis and in the ovary.

Among 2,506 primary and metastatic neoplasms seen at the Rizzoli Orthopedic Institute, a single example of adamantinoma of the tibia was found which occurred in a 44 year old man. The authors emphasize the histologic analogy between this tumor and basicellular epitheliomas. Surgical treatment is indicated since roentgen therapy has been proved inadequate.

As to pathogenesis, both the traumatic and the fetal theories are rejected by the authors, who favor the viewpoint that these so-called adamantinomas are basicellular epitheliomas derived from the inclusion of ectodermic cell nests. *—Alfred Wiener, M.D.*

Morton's Toe; Intractable Pain About the Fourth Metatarsophalangeal Articulation. Robert M. O'Brien. *Missouri Med.*, 1958, 55: 586.

Metatarsalgia is discussed by the author on the basis of his past experience. A typical case report is presented. A total of 26 cases are included in this report. Women were more often affected than men.

The diagnosis may be made almost entirely on the basis of subjective complaints and the failure of response to conservative treatment.

The treatment consists of a longitudinal incision on the anterior portion of the foot between the third and fourth toes. Dissection is carried down to between the metatarsal heads where the neurofibroma is found. The neurofibroma is excised and under ordinary circumstances there is no further trouble following the operation. *—Richard J. Bennett, Jr., M.D.*

Amputation Stump Pain. Thomas J. Canty and Eugene E. Bleck. *U. S. Armed Forces M. J.*, 1958, 9: 635.

In the Navy Amputation Center at Oakland, California 94 per cent of the amputees could be rehabilitated, obtaining not only freedom from persistent pain but also the ability to carry on a useful occupation.

The causes of painful amputation stumps are divided into (1) conditions prior to surgery, (2) immediate postoperative pain, and (3) late postoperative complications. Patients with gangrene due to thromboangiitis obliterans have more severe pain than those with arteriosclerosis or frostbite. The postoperative pain following amputation is severe because of the surgical trauma. Fifteen per cent of the amputees had pain caused by improper fit of the prosthesis. Other late conditions are due to dermatological disease, bursitis, osteomyelitis, trauma, chronic anoxia, osteoma, spurs, or phantom limbs.

After a breaking-in period, the amputee is usually able to wear his limb for 15 hours a day. The closed-end soft socket (Fig. 1) is helpful in preventing chronic passive congestion of the terminal stump end and also prevents chronic stasis eczema. By using the suction principle the piston action between the socket and the stump is prevented and the stump is locked in contact with the entire inner surface of the socket. The amputee releases the valve for removal of the stump from the socket.

In neuromas, which occur frequently, the treatment of choice is high excision and pulling down the nerve in its sheath. Some surgeons implant the nerve

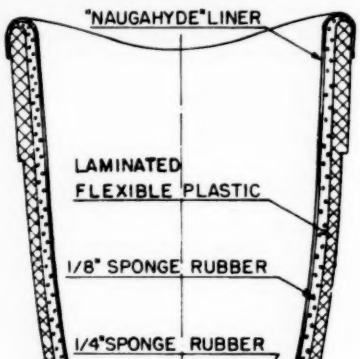

FIG. 1 (Canty, Bleck).

ends into a hole drilled into the bone, To avoid reformation of spurs by muscle pull, the sectioned ends of the muscles are sutured with mattress sutures to their antagonists.

Only 2 per cent of the amputees at this center had phantom pain. The treatment of this condition is still an unsolved therapeutic problem with the unfortunate victims becoming either drug addicts or alcoholics. Peripheral stump abnormalities evidently play a role in the production of phantom pain. Ultrasonic treatment has given temporary relief.

—E. H. Bettmann, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

A Critical Analysis of Methods of Fusion for Scoliosis; An Evaluation in 266 Patients. JOHN H. MOE. *J. Bone Surg.*, 1958, 40-A: 529.

THIS STUDY consists of an analysis of 266 patients with curvatures classified as idiopathic and paralytic scoliosis who were treated by the author between 1947 and 1956. A majority of them were traced for from 2 to 8 years postoperatively. An attempt has been made to correlate cosmetic appearance with correction of the curvature as shown by roentgenogram in classifying the results of treatment. Since 1954 the Risser localizer case has been used almost routinely.

There were 130 patients with idiopathic scoliosis, of whom 89 per cent were females. The average age at the time of fusion was 13.8 years. No curvatures with vertebral anomalies, whether congenital or associated with neurofibromatosis, were included in this group. The percentage of correction gained was calculated by subtracting the final degree of curvature from the maximum curvature as shown in a roentgenogram made with the patient standing previous to correction. This difference was then divided by the degree of the original curvature. A roentgenogram made with the patient either standing or sitting when he was last seen was used for the final evaluation.

The average gain in this series was 40 per cent. Patients with solid fusion in whom no pseudarthroses developed gained an average of 43 per cent. Those patients with pseudarthroses gained an average of 22 per cent while those in whom pseudarthroses persisted had only a 13 per cent gain. When the average percentage gain was correlated with the cosmetic evaluation, it was found that 101 patients rated as having good cosmetic results showed an average gain of 45 per cent, 20 patients rated as having fair results gained 24 per cent, and 8 with poor results showed only a 5 per cent gain. Seventy-eight per cent of the total number of patients were rated as having good cosmetic results. In this group of 130 patients with idiopathic scoliosis there were 165 separate spinal-fusion operations performed. The total number of operations for repair of pseudarthrosis was 22.

There were 136 patients treated for paralytic scoliosis due to poliomyelitis, 60 per cent of whom were females. The average gain in this group was 44 per cent. Those patients with fusions becoming solid without evidence of pseudarthroses at any time gained 47 per cent. Patients with graft defects gained 39 per cent, while in those with defects persisting in the graft, the average gain was 29 per cent. Patients rated as having good cosmetic results showed an average gain of 49 per cent. In this group 78 per cent were rated as having a good result. Without evidence of pseudarthrosis at any time, 85 per cent had good results. With graft defects present there were 67 per cent good results, while in those in whom defective fusion persisted, there were 43 per cent rated as having good cosmetic results. The average loss of correction in this group was 12 degrees. With pseudarthroses persisting, there was an average loss of 31 degrees. There were 136 patients with paralytic scoliosis on whom 212 separate spinal fusions were performed. There were 37 operations for pseudarthrosis in this group. *—Bernard C. Gerber, M.D.*

FRACTURES AND DISLOCATIONS

The Kirschner Wire Fixation of Children's Fractures (Die Kirschner-Drahtfixation jugendlicher Frakturen). A. ARQUINT. *Helv. chir. Acta*, 1958, 25: 32.

THE GOAL of fracture treatment is complete restoration of function by solid union of the fracture in the anatomical position. The most certain method of reduction and fixation is doubtlessly osteosynthesis. Because of better understanding of fracture healing, improved techniques, and advances in pharmacology and anesthesiology, the operative treatment of fractures is increasing. At the same time the results following healing of the fracture have been improved.

The simplest method of osteosynthesis is temporary percutaneous nail or wire fixation. This method has been discovered and rediscovered in many countries in the course of the last century. The greatest advantage of the method lies in the fact that the materials and instruments used are universally available, sim-

ple, and reasonable in cost. The method is applicable in many different types of fractures. The size of the foreign body introduced is minimal. The stability of the osteosynthesis is surprisingly good. The fracture must, of course, in addition, be supported by external fixation. The method has proved to be of great value in the treatment of open fractures.

Percutaneous wire fixation is applicable only in subcutaneous fractures which are readily palpable. It can be carried on under local anesthesia (ulna, tibia, and malleoli). In deeper fractures there is for the patients the risk of the trauma of reduction and the dangers of infection, and, for the doctor, the risk of the slipping of the wires and their uncertain position, and, for both the patient and the doctor, the dangers of radiation injury. Because of these difficulties open reduction with wire fixation of femoral fractures under direct vision was employed. With ideal reduction, lack of interposition and diastasis, good fixation, and freedom from infection, there are hardly any cases of delayed fracture healing or pseudarthrosis. After the usual preparation of the skin a general anesthetic was given, and under the strictest aseptic technique and through a small incision in the classical anterolateral position, the fracture was approached. After exact reduction under vision, without special stripping of the periosteum, the fracture was fixed with two or three strong wires, introduced at a site which was remote from the sound. The wires were free of tension, as perpendicular as possible, and at the greatest possible angle to one another. They were bored through the cortex, first of the mobile and then of the stable fragment. After demonstration of satisfactory stability, penicillin was injected and the wound was closed. The wires were cut about 2 cm. outside of the skin and covered with sterile dressing. As supplementary external fixation a hip spica cast, with semiflexion of the knee joint, was applied. The position of the wires was marked on the plaster, so that later a window for the removal of the wires could be cut. This was done between the third and seventh weeks, after definite consolidation of the fracture had occurred. The time of consolidation of the fractures in this series corresponded well with the average time of consolidation of fractures treated by the conservative method for patients in the same age group. Complications such as infections and wandering of the wires were not encountered. Examination of the patients 7 to 19 months after treatment revealed no subjective difficulties, primarily healed scars, complete joint function, and a relative lengthening of the fractured thigh up to a maximum of 10 mm.

On account of the extraordinary tendency to heal in fractures of infants and children, one certainly ought to be restrained with reference to osteosynthesis. One must, however, remember that rotation displacements are definitive, and that the preponderant number of femoral fractures (about 70 per cent) lie in the middle of the shaft where the possibilities of correction are diminished. In principle, one ought also in children to strive for an anatomical reduction, and the growth factor ought to give little excuse for unfavorable position of the fragments. In small children the adhesive plaster extension is the method of choice. This method, however, will often not produce good results in older children. A Kirschner wire traction with its inherent danger of infection and epiphysial injuries, and without certainty of a good position of the fragments, is scarcely to be preferred to a temporary osteosynthesis.—*Robert D. Larsen, M.D.*

The Hanging Cast Method for the Treatment of Fractures of the Humerus (Das Haengegipsverfahren zur Behandlung von Oberarmfrakturen). F. Bless. *Helv. chir. acta.*, 1958, 25: 50.

In 1933 Caldwell described the hanging cast method for the treatment of fractures of the middle and distal thirds of the shaft of the humerus. Caldwell emphasized that he used the hanging cast only in fractures of the shaft of the humerus. The indications have subsequently been broadened by other workers, and some now also use the hanging cast method for fractures of the surgical neck of the humerus. Others have gone so far as to employ the hanging cast method in the treatment of all fractures of the humerus. All workers agree that the hanging cast is applicable only for patients who can spend the greater part of the day out of bed. They also stress the necessity for frequent roentgenographic control and personal examination of the patient after the cast has been applied. This is particularly necessary in the first few days of the treatment. The results with this method, as reported in the literature, are good in about 85 per cent of the cases. Only about 1 per cent of the patients in several large series have been reported subsequently to have pseudarthrosis.

At the author's clinic, the hanging cast was previously used only for selected cases. Since 1956, however, it has been used almost universally. Patients who have associated injuries which require them to be in bed should not be treated with the hanging cast. The patient is placed on a stool for the application of the cast. Usually, the cast can be applied without anesthesia, although the occasional patient may require infiltration with local anesthesia at the fracture site. Reduction of any displacement should be corrected by traction on the elbow, with counter traction in the axilla, and simultaneous manipulation of the fragments themselves. Transverse fractures and those fractures which have an obvious interposition of soft tissue, usually cannot be treated with a hanging cast. Varus position of the fragments can usually be corrected by pronation of the forearm. Valgus position of the fragments is much less common but can usually be corrected by supination of the forearm. After the reduction of the fragments, which takes place under roentgenographic control, the hanging cast is applied. The forearm is held in a rigid position by an assistant. The styloid processes of the radius and ulna, as well as the humeral condyles and the olecranon, are padded with felt. A posterior splint is applied, extending from the metacarpophalangeal joints to the region of the axillary fold. The splint is then covered with circular plaster. If it is not necessary to correct the axial rotation of the humerus by pronation or supination of the forearm, it is permissible to allow the plaster to end at the wrist joint. In fractures of the distal humerus, the plaster does not reach to the axillary fold but extends only 2 to 3 cm. above the level of the fracture. A metal ring for attachment of a sling is incorporated in the

cast at the level of the wrist joint. The finished cast weighs between 700 and 800 grams.

If angulation of the fracture is still present on the roentgenogram after the cast has been applied, this is corrected by elevation or lowering of the wrist joint by adjusting the length of the neck sling. If valgus or varus deformity is still present, this can be corrected by giving the metal ring at the wrist joint an eccentric position. A second ring is incorporated in the cast, at the olecranon; this allows traction to be applied to the cast when the patient is recumbent. Exercise of the finger joints is started on the first day. Pendulum exercises of the shoulder joint are begun on the fourth day. Active exercise of the shoulder musculature is started during the fourth week. As a rule the plaster is removed after 8 weeks.

The author's experience is based upon the results obtained from the treatment with the hanging cast of 37 patients who had fractures of the humerus. These patients were divided into two groups. The first group consisted of those who were either treated exclusively with the hanging cast or were treated at first with a hanging cast, which was supplemented by other methods of treatment later on; and the second consisted of those patients who for a variety of reasons were treated with the hanging cast later in the course of the treatment.

There were 30 patients in group one. Nineteen of these 30 patients had oblique or spiral fractures of the humeral shaft. There were 4 comminuted fractures. The reduction of the comminuted fractures was surprisingly successful. Four transverse fractures, 1 subcapital fracture, and 2 supracondylar fractures were also included in group one. Of the 30 patients in group one the cast was applied to 20 without anesthesia. Eight required local infiltration at the fracture site, and only 2 required general anesthesia for the reduction. In those patients who had the hanging cast as the only method of treatment, the cast remained on for between 24 and 121 days, with an average of 56 days.

The results were excellent in 21 of the 30 patients, with complete consolidation of the fracture in the proper position and with free motion of all joints. The duration of treatment in this group averaged 13 weeks. Three other patients had some limitation of elevation and abduction of the shoulder joint, and in addition, minor limitation of extension of the elbow joint. The remaining 6 patients in group one had various complications. Eight of the patients in group one were treated on an ambulatory basis. A review of all of the humeral shaft fractures in the author's clinic, treated in the year 1956, reveals the shortest average hospital stay to be in the group of patients who were treated by the hanging cast.

Group two is composed of 7 patients on whom the hanging cast was not used primarily, but was applied later in the course of treatment. In this group the treatment was changed to the hanging cast to allow ambulatory treatment in 1 patient, to improve the position in 2 patients, and to make the patient more comfortable in 3 cases. On the basis of the experience obtained in the author's clinic, the following indications and contraindications for the use of the hanging cast in the treatment of fractures in the shaft of the humerus have been formulated. The indications include:

1. Closed, uncomplicated, oblique or torsion fractures.
2. The patient must be able to be out of bed for the greater part of the day.
3. The patient must be at least of school age.
4. The patient must willingly co-operate with the treatment.
5. It must be possible to have follow-up examinations and roentgenograms at regular intervals.

Contraindications include: (1) transverse fractures, (2) open fractures, (3) fractures accompanied by primary nerve lesions, (4) fractures with obvious soft tissue interposition, (5) the bedfast patient, (6) patients of preschool age, (7) failure of the patient to co-operate with the treatment, and (8) inability of the patient to co-operate with the follow-up examinations.

The advantages of the hanging cast method include the ease of application, the comparative simplicity of reduction, and the ease of control and correction of displacement. Secondary displacement of the fragments is uncommon. The hanging cast is comfortable and painless. The treatment can usually be conducted on an ambulatory basis. The shoulder joint can be moved freely after a few days, thus avoiding the complications which occur when the shoulder joint is immobilized. The disadvantage of the hanging cast method lies in the simplicity and comfort of the method. Because of this, the patient may fail to co-operate completely with the treatment, and in so doing will jeopardize the final result.—*Robert D. Larsen, M.D.*

ORTHOPEDICS IN GENERAL

Circulatory Problems in Limbs Immobilized in a Cast (Durchblutungsprobleme nach Gipsverbaenden). Fr. Schedel. *Zbl. Chir.*, 1958, 83: 767.

The author studied the circulatory changes which are seen in the extremities after prolonged immobilization in a cast. According to him, circulation of the blood in a limb depends on metabolic activity of the tissue and regulation of the temperature. The vascular bed proper at the periphery consists of arterioles, metarterioles, capillaries, and venules. The lumina of the smaller vessels change constantly, depending on the metabolic activity of that particular area. There is also neurogenic influence from the autonomic nervous system and locally from the accumulation of metabolic end-products.

After an extremity is immobilized in a cast, it frequently shows trophic changes consisting of muscular atrophy, pallor, and decrease in the skin temperature. When it is elevated the pallor increases, and when lowered it becomes cyanotic and perspires. These changes are due to a capillary constriction and lack of adaptation in the venules. When active muscle contracture is started, the cyanosis is increased because the circulation does not respond to an increased demand of the tissue.

In order to investigate the described changes objectively, the author measured the skin and tissue temperatures, and performed oscillography on limbs immobilized in a cast. Since the temperature of the skin depends on the circulation, a time unit of temperature

gives the approximate activity of the circulation in the area examined. With this method the author has found that shortly after the occurrence of fracture, the temperature of the skin is elevated 9.89 per cent if the temperature on the healthy side is considered as 100 per cent. It is lowered on an average of 2.21 per cent after prolonged immobilization in a cast. Similar findings were present when healthy limbs were immobilized in a cast.

Determination of the tissue temperature and oscillography showed similar results. With oscillography the decrease in reading averaged 17.75 per cent in fractured limbs after immobilization in a cast and 20.75 per cent in healthy limbs after a similar period of immobilization. In recent fractures the oscillogram showed an average increase in value of 1.68 per cent. It was also interesting to note that after immobilization in a cast, the response of the extremity to vasoconstricting drugs was absent, but it was almost normal to vasodilators. When an operation was performed on a fracture and followed by immobilization in a cast, or a walking cast was used, the oscillographic findings were normal or increased. In the author's opinion these findings distinctly point to the presence of circulatory constriction in immobilized limbs.

Carefully prepared diagrams demonstrating the described changes are included in the original article. In his next article the author will publish his findings following the use of the isotope resorption technique, venopressure measurements, arteriograms, and venograms. —*George B. Wichman, M.D.*

A Morphological and Physiological Study of Bone Sensitivity. YOSHINOBU SUGIURA. *Arch. jap. Chir.*, 1958, 27: 597.

THE OBJECT of this study is to show that bone has sensory afferent nerves within its substance. This is contrary to popular belief that afferent endings exist only in the periosteum. Three methods of study were used: (1) intensive histological study, (2) histological study following posterior rhizotomy, and (3) reaction of the bone marrow to electrical stimulation. A review of the literature with the divergent opinions found is given.

A special method of preparation of the tissues is presented; it is felt that this permits preservation of the nerves that is not otherwise possible. The periosteum was found to have abundant myelinated and nonmyelinated nerve fibers which enter the bone through haversian canals accompanying the blood vessels. The nerve fibers in the periosteum ended freely or in arborizations near the surface of the bone. The layers of elastic tissue had special glomerular end-corpuscles in which the nerves terminated.

Within the bone the nerve fibers accompany the vessels through the haversian system. The myelinated nerves are more numerous in the metaphysis than in the diaphysis. These are also distributed to the marrow. The course is slightly winding and some are surrounded by fine autonomic nerve fibrils. In the deeper portion of the system the nerves terminate in fine fibrils which run along the vessels or are distributed to the endosteum of the canal. In some sections the fibrils appear to enter the interstitial tissue between the osteocytes but are not connected to them.

In the marrow the nerves followed the vessels and terminated in free endings. The fibers formed plexuses along the course of the vessels.

The same histological study was conducted on the femurs of dogs after sectioning the posterior nerve roots distal to the spinal ganglia. The nerves in the haversian system showed degeneration when sectioning was conducted in the appropriate area. Since the autonomic nerve cells are distal to the sectioned fibers, they should not be affected and, therefore, the author concludes that the degenerated nerves are "afferents" of the central nervous system.

Finally, the marrow of bone was stimulated electronically before and after the femoral and sciatic nerves were sectioned. With the nerves intact there was a marked increase of blood pressure, but there was no reaction with sectioned peripheral nerves.

In conclusion the author states that the terminal nerves in the haversian system are afferent sensory nerves but may also play other unknown physiologic roles. —*Richard G. Saxon, M.D.*

Symposium on the Treatment of Osteoarticular Tuberculosis (Symposium sur l'orientation actuelle du traitement de la tuberculose ostéo-articulaire). M. J. DELCHEF. *Acta orthop. belg.*, 1958, 24: 7.

THE TREATMENT of bone and joint tuberculosis prior to the use of chemotherapy relied chiefly on prolonged immobilization and the results were poor. The author in an informal and discursive manner reviews the development of this phase.

Since the introduction of streptomycin and other antituberculosis drugs, the approach toward tuberculosis of the spine, hip, and knee has changed toward earlier and more aggressive surgical intervention. Local instillation of drugs into abscess cavities has permitted direct surgical attack, such as early resection of the affected synovia in the hips of children and adults. For disease of the vertebral column with compression of the spinal canal the author advocates anterolateral decompression, as described by Seddon in 1955, for patients not responding to orthopedic treatment or aspiration. Sequestra are removed and the cavities are curetted. Of 12 patients with Pott's disease, 9 of whom were paraplegics, 6 recovered completely. If necessary, the spine was supported by a posterior bone graft. —*John H. Wulsin, M.D.*

Malignant Tumors of the Synovial Membrane (Contributo allo studio dei tumori maligni della membrana sinoviale). T. DI GIULIO and E. MASDEA. *Boll. oncol.*, Rome, 1957, 31: 677.

THE AUTHOR describes 3 cases of malignant synoviomas. The first patient was a 32 year old female in whom the tumor mass was located along the medial aspect of the right knee and the lesion grossly involved the tibia and the insertion of the muscles.

The second patient was a 24 year old female who noted an enlarging tumefaction along the anterior aspect of the left thigh immediately above the knee. The roentgenogram showed extensive involvement of the femur and the biopsy of this tumor mass showed that it was a malignant synovioma.

The third patient was a 42 year old female who had an amputation of the left index finger for a cystic

tumor, and two weeks later was noted to have a palpable gland in the elbow. Biopsy revealed that the gland had the same consistency as the tumor mass from the amputated finger. Eight months later this patient developed extensive metastases to the pleura, lung, and skin, and died within one year.

It is very difficult to determine whether a malignant condition is present on the basis of the histological appearance of these lesions. Malignancy of these lesions should be suspected by the following features:

The solid cords of cells are interrupted by fissures and irregular spaces of variable dimension which form a lumen containing amorphous material. This material is intensely eosinophilic. It gives the lesion an appearance of a pseudocarcinoma. The cells surrounding these areas are pleomorphic, with flat, cuboidal, cylindrical, or polygonal shapes. Pseudoacini and papillary configuration may also be present. It is from these aspects that the nature of the tumor tissue is suspected rather than from the appearance of the individual cell. Although a lesion may present itself as a benign mass grossly, if it has the described histological appearance it should be treated as a malignant tumor. —*Roland A. Manfredi, M.D.*

Discrepancies in Leg Length in Tuberculosis of the Hip Joint in Children (Les inégalités de longueur des membres inférieurs, séquelles de la coxalgie de l'enfant). JEAN CAUCHOIX and YVES COTREL. *Rev. chir. orthop.*, Par., 1958, 44: 24.

ONE HUNDRED FOUR cases of tuberculosis of the hip joint in children, who were less than 15 years of age were studied. They were divided into two groups. In 62 cases the onset of the disease occurred before 1952, and in 42 cases after January, 1952.

In the first group the period of immobilization was 33 months and an ankylosis was the end result in 83 per cent. In 3.2 per cent the affected limb grew longer and in 83 per cent there was a shortening. The shortening of the limb was caused by destruction of articular cartilage (10 mm. average) with or without flexion and adduction deformities, destruction of proximal femoral growth cartilage, and disturbances in the proximal and distal epiphysial cartilages at the knee.

These growth disturbances at the knee joint are very important and occurred in 33 per cent of the cases. All of these patients were between 2 and 7 years of age. In 14 patients who were immobilized longer than 40 months there was an incidence of 78 per cent of shortening of the leg.

In the second group the immobilization lasted 12 months. Only 35 per cent were ankylosed and 9.5 per cent of the limbs were lengthened while 26 per cent were shortened. In this group, the duration of immobilization had been notably shortened, and the hip spicas used to immobilize the affected articulation were fashioned to permit some mobility of the knee joint. Two cases of shortening through alteration in the proximal femoral cartilage occurred and 4 of lengthening of the femur. In this group of patients, there were no disturbances at the epiphysial cartilages of the knee.

This paper should be read by anybody interested in the problem of tuberculosis in children.

—*J. C. Mulier, M.D.*

The Iliotibial Tract; Clinical and Morphological Significance. EMANUEL B. KAPLAN. *J. Bone Surg.*, 1958, 40-A: 817.

A STUDY is presented of the iliotibial tract in relation to the tensor fasciae latae muscle, the action on the knee, the comparative anatomy of the tract and the fascia lata, and the clinical significance in contractures of the hip and knee.

A detailed review of the literature and some recent textbook descriptions are presented. There is a divergence of opinion about the actions of the tract and the tensor fasciae latae muscle even in recent textbooks. The work of Duchenne with electrical stimulation and observation of poliomyelitis patients showed that the muscle flexed and internally rotated the thigh but had no action on the leg. No abduction at the hip was noted. Modern texts differ radically on the action of the band and the tensor muscle.

Dissection of many types of animals (mammals, reptiles, and amphibians) was conducted. All mammals have a distinct tensor fasciae latae muscle, but only man has a definite iliotibial band. The author concludes from this study that the tract is an independent structure developing in man in relation to the development of the gluteus maximus muscle and man's upright posture.

A description of the iliotibial tract from the author's own dissection is presented. The tract runs from the ilium to the tibia and is connected to bone except at the lateral aspect of the knee. It is connected to the entire length of the linea aspera and the supracondylar ridge through the lateral intermuscular septum, to the patella, and to the fascia of the biceps femoris muscle. Traction on its distal half does not extend the knee. In the cadaver it is taut when no muscle contraction exists.

Electrical stimulation of the tensor fasciae latae muscle substantiated the findings of Duchenne. There was flexion of the thigh with strong internal rotation. The fascia lata was retracted over the thigh muscles. Stimulation of the gluteus maximus produced strong extension and slight external rotation. No knee movement was observed when either muscle was stimulated.

Surgery on the tract does not seem to produce any untoward effect on the hip or knee joints. Sections of iliotibial band may be removed with no ill effects. Stability of the knee joint is enhanced by the distal portion of the tract between the supracondylar area of the lateral femoral condyle and the lateral tibial tubercle (tubercle of Gerdy).

The author thinks that contractures about the hip in flexion and abduction are due to combined gluteal and tensor fasciae latae involvement. The tensor does not contribute to knee deformities. Paralysis of the tensor alone cannot produce a positive Trendelenburg sign without gluteal involvement. The importance of the tract and the tensor muscle has possibly been overestimated as a deforming factor in paralysis and contracture. —*Richard G. Saxon, M.D.*

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Therapeutic Trial with Different Nicotinic Acids in Peripheral and Cerebral Circulatory failure (Therapeutische Beeinflussung peripherer und zerebraler Durchblutungsstoerungen mit verschiedenen Nicotinsaeurederivaten). H. J. STEINKE. *Zbl. Chir.*, 1958, 83: 444.

A COMPARATIVE STUDY of the following vasodilators was made by the author: sodium nicotinate (nicodan), nicotyalamide (nicobion), betapyridylcarbinol (ronicol), and ronicol compositum (ronicol 100 mgm., acetylcholine 50 mgm., mestinon 1 mgm.).

Ronicol and ronicol compositum were considered the most satisfactory vasodilators on the basis of elevation of the skin temperature, and clinical improvement. —*Marc Verstraete, M.D.*

Raynaud's Disease. RAY W. GIFFORD, JR. *Minnesota M.*, 1958, 41: 226.

RAYNAUD'S PHENOMENON results from intermittent spasm of small arteries and arterioles, usually in the fingers, less often in the toes. It can be associated with and secondary to many unrelated diseases and conditions some of which are serious and even fatal. The prognosis is, therefore, uncertain until a diagnosis of primary or true Raynaud's disease can be substantiated by ruling out other causes for Raynaud's phenomenon. Raynaud's disease occurs primarily in young women. Usually cold is the stimulus which precipitates appearance of the phenomenon. Raynaud's disease is a benign condition; no mortality is associated with it, and serious disability infrequently results. The complications of Raynaud's disease, consisting of trophic changes, sclerodactylia, and calcinosis cutis, occur separately or together in 30 per cent of cases. Often the disability thus caused is minimal. Raynaud's disease does not lead to extensive gangrene, and major amputations are never necessary. Raynaud's disease is the most common but least serious of the many conditions with which Raynaud's phenomenon may be associated.

Protection of the hands and feet from cold and mechanical trauma is important. Vasodilating drugs sometimes are helpful, but often are not needed. Conservative treatment is effective for most patients with Raynaud's disease, but in resistant cases surgical sympathectomy is indicated.

Hemangiomatosis of the Skin, Spleen, and Kidneys Associated with Multiple Malformations (Haemangiomatose der Haut, Milz und Niere im Rahmen multipler Missbildungen). P. SCHEID. *Zbl. Chir.*, 1958, 83: 422.

THE AUTHOR reports the case of a male, 40 years old, who complained of repeated hematuria without evident cause. The patient had partial hypertrophy of the second and third toes of the right foot and hemangiomatosis of the spleen, kidneys, and skin of the left lumbar area. Venous insufficiency secondary to varices and a varicocele on the left side were also present. The pathological findings of the enlarged spleen (1.165 gr.) were diffuse sinus hemangiomatosis with multicentric cavernous transformations. These findings fit the diagnosis of the Klippel-Trénaunay-Weber syndrome (localized hypertrophy of the toes, varices, varicocele, angiomatosis of the skin, and hemangiomatosis of the spleen and kidneys).

—*M. Verstraete, M.D.*

Surgical Aspects of Circulatory Disorders (Chirurgie der Durchblutungsstoerungen). H. W. PÄSSLER. *Zbl. Chir.*, 1958, 83: 356.

ON THE BASIS of complete history, and clinical and technical studies, diseases of the peripheral arteries are classified into organic and functional groups. Concerning technical investigations, angiography of the peripheral arteries and veins is considered to be a routine procedure and the technique used is described in detail.

The treatment of choice for organic arterial diseases and endangiitis obliterans is resection of the sympathetic chain. The author performs the bilateral retroperitoneal lumbar sympathectomy. This technique was chosen because the transperitoneal route decreases the tonus of the abdominal muscles. The success of this operative treatment lasts at least for some years. Consideration is given to the limited value of endarterectomy and the growing value of homeografts.

The decreased immediate and postponed arterial flow associated with bone fractures is considered, and the ischial syndrome associated with a decrease in the peripheral arterial flow from arterial spasm is discussed at length.

In Sudeck's atrophy an initial increase of arterial oscillations was found and related to a progressive tissue acidosis. This acidosis may possibly be secondary to oxygen debt caused by vegetative nerve irritation. Sympathetic blockade and the administration of hydrocortisone might be helpful.

—*M. Verstraete, M.D.*

Aortic Thrombosis. F. STARER and D. SUTTON. *Brit. M. J.*, 1958, 1: 1255.

AORTIC THROMBOSIS (Leriche syndrome) occurred in 0.15 per cent of 33,000 general hospital autopsies, and in 0.61 per cent of 4,500 cases referred to a special vascular clinic. The authors report their findings in 32 patients observed during a 4 year period at St. Mary's Hospital, London. There were 24 male and 8 female patients, ranging in age from 37 to 78 years; the average age was 51.3 years, which approximates that found by other workers. The most frequent symptom was intermittent claudication, which usually began in the calves and gradually involved the thighs and hips; the next most frequent was loss of power in the legs accompanied by muscle wasting and was present in one-half of the cases. Other complaints included impotence in the male, backache, coldness of the feet,

and nutritional changes in the skin and nails. Ulceration and gangrene were uncommon.

On examination, absence of femoral and more distal pulsations is typical and at times in thin patients the level of aortic block may be palpated; other signs are muscle-wasting and neurological changes, and heart disease and hypertension in a significant number of cases. Roentgenograms of the abdomen are unrevealing, but aortography is most useful in making a positive diagnosis. Aortography was done in the authors' cases, although they stress the possible morbidity from the procedure and warn that it must be done by experienced personnel. The underlying pathologic process in most of the cases was atheroma with superimposed thrombosis. Three patients had a recent history of trauma, and 6 had mitral stenosis with fibrillation which may have been responsible for multiple emboli to the iliac vessels with subsequent thrombosis. Leriche thought the disease was the result of a peculiar arteritis; other factors have also been mentioned but not authenticated. The hypertension, when present and not coincidental, may be due to involvement of the renal arteries by thrombosis, extending from the aorta, and this possibility should be considered in young individuals with malignant hypertension, since cures have been reported following operation.

The prognosis is not as gloomy as it was once thought to be, especially since the advent of surgical therapeutic measures, but even without surgery many of these patients lead useful lives and the dangers of operation in these poor-risk patients must be weighed against the prognosis of the untreated disease.

—*Albert M. Schwartz, M.D.*

Indications, Surgical Technique, and Results of Lumbar Sympathectomy in the Treatment of Obliterative Arterial Disease of the Lower Extremity (Indicazioni, tecnica e risultati della ganglionectomia lombare nelle arteriti obliteranti croniche degli arti inferiori). M. VENTURA and N. TESSAROLO. *Acta. chir. ital.*, 1958, 14: 191.

FROM 1950 to 1955 the authors operated on 63 patients with obliterative arterial disease of the lower extremities. Seventy-seven lumbar sympathectomies were carried out on the 63 patients, a bilateral procedure being performed in 14. In 31 patients the lesions were those of thromboangiitis whereas in 46 patients a diagnosis of arteriosclerosis obliterans was made. The authors state that sympathectomy should be strongly considered in all cases before the onset of irreversible complications. The best results were obtained in patients at stage 2 (Fontaine) when the only symptomatic manifestation was intermittent claudication. The function tests routinely used were oscillography, skin temperature studies, and circulation times.

The approach most frequently used was through an oblique incision running from the costal margin at the level of the anterior axillary line to the umbilicus with division of the anterior rectus sheath if required.

The results in this series were considered satisfactory. The patients were followed up for one to 5 years. Regarding the 31 patients with Buerger's disease, all those operated on before the onset of complications were improved. Of the 10 patients operated on after the onset of pain or the formation of ulcerations, 1 was unimproved and 2 underwent amputation subsequently. Of the 46 patients with arteriosclerosis obliterans, the results were good in the 17 patients who were operated upon after the onset of ulcerations and pain at rest, only 8 had a good result; 1 remained unimproved and 5 had an amputation at a later date.

—*René Menguy, M.D.*

Actual Possibilities of Arterial Surgical Repair (Die heutigen Möglichkeiten der wiederherstellenden Arterienchirurgie). A. SENN, P. LUNDSGAARD-HANSEN, and R. WÄLTI. *Schweiz, med. Wschr.*, 1958, 88: 275.

ALL PATIENTS with acute or chronic arterial insufficiency should be given the benefit of a complete clinical examination for evaluation of possible improvement by surgical treatment.

The patient with acute arterial occlusion should be treated surgically within the first 4 hours. The selection of patients with chronic segmental arterial occlusion that come into consideration for endarterectomy, resection with grafting, or by-pass grafting is discussed. The authors' experience with homografts or nylon grafts is reported. —*M. Verstraete, M.D.*

Chronic Obstruction of the Pelvic Veins and Its Surgical Treatment (Die chronische Beckenvanensperre und ihre chirurgische Behandlung). R. A. LEEMANN. *Schweiz. med. Wschr.*, 1958, 88: 397.

FOUR TYPICAL INSTANCES of chronic obstruction of the pelvic veins have been observed at the Canton Hospital, Winterthur, Switzerland, since the summer of 1956. Three patients were operated upon.

The first was a 16 year old youth, whose symptoms began 4 months after a skiing accident, a fracture of the right tibia, with subsequent venous thrombosis of that side.

The phlebolysis according to the method of Wanke disclosed an extensive periphlebitic fibrosclerotic process with marked narrowing of the external iliac vein from the inguinal region to the level at which it was crossed by the internal iliac artery. The sclerotic tissues were removed and 2 cm. of the artery over the vein were resected. The venous lumen itself seemed to be unobstructed.

Postoperative convalescence was uneventful and at the time of dismissal the patient no longer complained of symptoms; the swelling of the leg had regressed and the varicosities of the inguinal region were less noticeable. Six months later the patient was active and well.

The second patient was a 37 year old woman who suffered an attack of thrombophlebitis following her second delivery; both deliveries had been by cesarean section. Her symptoms of chronic edema of the left lower extremity and sensations of weight and pain were not relieved by wearing an elastic stocking.

At operation the findings were practically identical with those encountered in the first case and the same operative technique was used. When the patient was discharged the symptoms had decreased, and 4 months later had disappeared. Wearing of the elastic stocking was omitted.

The third patient, a 37 year old serving maid, suffered a rupture of the left kidney as a result of a

traffic accident. Following nephrectomy a severe venous thrombosis of the leg with phlegmasia alba dolens developed.

Despite the absence of recanalization of the left external iliac vein, an exploratory operation was carried out. The left external iliac vein which had become transformed into a heavy, bloodless cord, was removed from the left inguinal region to the caval bifurcation. Histologically the process consisted of venous obliteration with mural sclerosis.

The postoperative course was uneventful, the symptoms were relieved and an elastic stocking could now be tolerated. Three weeks later the preoperative cramplike pains had ceased and the swelling of the leg was markedly diminished.

In agreement with the views of Wanke (*Langenbecks Arch. u. Deut. Zschr. Chir.*, 1955, 282: 704; abstract in *Internat. Abst. Surg.*, 1956, 103: 296) simple operative freeing of the pelvic vein involved is indicated only when the more peripheral veins are competent; otherwise ligation of the superficial femoral veins or another form of surgery will have to be added.

The author believes that cases of chronic obstruction of the large pelvic veins should always be thought of as chronic trophic disturbances of the leg and routine phlebographic examination instituted.

—*John W. Brennan, M.D.*

Adenosine-5-Monophosphate in Venous Insufficiency. MYRON H. STEINBERG. *Angiology*, 1958, 9: 154.

FOLLOWING REPORTS in the literature of favorable results in the treatment of complications of venous insufficiency with adenosine-5-monophosphate (A5MP), the author evaluated the cases of 372 patients treated with the compound over a period of 7 years. The regimen consisted of intramuscular injections of 20 mgm. of A5MP, originally in aqueous solution given daily or several times a day, and later a sustained-action gelatin preparation was used one to three times weekly. In addition, routine measures of periodic rest, elevation, Unna boots, elastic stockings, sponge rubber dressings, and antibiotics were employed when indicated. Patients who had been treated previously by the latter methods only were used as controls. The cases were divided into 5 categories: In group 1 (162 patients) with ulcers due to varicosities or thrombophlebitis 86 per cent of the cases were benefited by A5MP therapy. In group 2 (126 cases) with stasis dermatitis, 88 per cent of 81 with varicosities as the underlying disease showed benefit and 80 per cent of 45 due to thrombophlebitis. In group 3 (12 patients) with pruritis alone, 50 per cent (6 patients) were markedly improved, the other 6 had no response whatever. In group 4 (12 patients) with chronic fibrositis following thrombophlebitis there was a good response in one half of the patients but not in the remaining cases. In group 5 (60 patients) with acute thrombophlebitis of superficial veins 80 per cent showed favorable response, and in 70 per cent the improvement was marked or good. Illustrative case reports are included.

The modus operandi of A5MP in these conditions is not known; it provides some vasodilatation, appears to alter tissue metabolism, and to help preserve normal cellular function in tissues affected by acute thrombophlebitis and thereby prevent the initiation of tissue changes which eventually result in chronic thrombophlebitis. In view of his findings, the author concludes that the drug is a valuable adjunct in the therapy of venous insufficiency. —*Albert M. Schwartz, M.D.*

Venography as a Guide to the Surgery of Stasis Ulcer of the Leg. EDWARD W. FRIEDMAN, E. MARVIN HENKEN, and EDWARD D. FRANK. *N. England J. M.*, 1958, 258: 1146.

ALTHOUGH the pathogenesis of chronic stasis ulcer is not well understood, it is generally accepted that an important factor is excessive venous pressure in the leg. Surgical treatment consists of obliteration or removal of incompetent venous channels that produce chronic elevation of venous pressure in the region of the ulcer, or excision of the ulcer and surrounding damaged tissues followed by skin grafting. The authors report their experience with the first method, and with the localization of hidden incompetent venous channels by venography. Thirteen patients with histories of complicated stasis ulcer were studied. The method consists of placing the patient supine on a tilt table and 5 minutes after an intravenous dose of 1 ml. of the contrast medium (hypaque), the table is tilted 45 degrees (feet down), a rubber tourniquet is placed just above the ankle tightly enough to occlude the superficial veins, and 20 ml. of contrast medium are injected over a one minute period into a dorsal foot vein. After 15 ml. are injected the first exposure is made, the cassette changed, and the tube shifted for the stereoscopic examination which is made at the completion of the injection. The solution travels from the dorsal foot vein into the deep veins of the leg because the superficial veins are occluded by the tourniquet. In the normal leg the medium remains in the deep system. Any flow from the deep to the superficial system via dilated and tortuous veins is abnormal and occurs only when the communicating vessels have incompetent valves. An alternative method utilizing two catheters is also described.

Of the 13 patients treated surgically on the basis of the venographic findings, 10 have remained healed for 3 to 7 years, and in the 3 recurrences repeat venograms showed residual or new incompetent perforators. The operative technique consisted of excision of visualized incompetent veins and the greater saphenous vein if this had not been done previously; in some cases with severe soft tissue damage, excision of the ulcer area and skin grafting were also performed. Case histories with reproductions of 3 venograms are included and illustrate the necessity of elimination of all incompetent channels to effect a lasting cure in these difficult cases.

—*Albert M. Schwartz, M. D.*

BLOOD; TRANSFUSION

The Effect of Hypothermia on the Blood and Blood-Forming Tissue of Dogs. (Text in Greek). B. ANGELOPOULOS, K. TOUNTAS, F. LIASKOS, and P. KALAKONAS. *Helliniki Iatriki*, 1957, 26B: 521.

FOURTEEN DOGS weighing from 8 to 15 kgm. were subjected to hypothermia and the changes in their blood and hemopoietic system were studied. This work was done in the Research Laboratories of

the Queen Frederika General Hospital in Piraeus, Greece. The rectal and esophageal temperatures were recorded with an electric thermometer continuously. The cooling was performed with the bathtub technique, and the temperature was allowed to go down to between 29 and 30 degrees C., with a subsequent drift to from 24 to 26 degrees.

The authors found the following changes in the blood:

The white count was low during hypothermia but the eosinophile count remained either unchanged or slightly depressed. The red cells, hematocrit, and hemoglobin values showed increases. The blood urea, blood sugar, potassium, sodium, and calcium of the serum were essentially unchanged. The platelet count went significantly down to almost 80,000 in some cases from the preoperative level of 400,000. The platelets were also found morphologically changed. The coagulation and prothrombin time were unchanged, but the bleeding time was prolonged from an average of one minute and 45 seconds to more than 7 minutes. While the peripheral blood did not show any significant morphological change, the medulla did show changes, especially the erythroblasts and the young type of white cells. The megakaryocytes were unchanged. The authors conclude that the hemorrhagic tendency seen in hypothermia is due mainly to the reduction of the number of platelets (thrombocytopenia) and also to the inability of the enzymes to function in lower temperatures.

—*Michael G. Seremetis, M.D.*

Transfusion Reactions from Contaminated Blood. Abraham I. Braude. *N. England J. M.*, 1958, 258: 1289.

The saprophytic bacteria that inhabit the premises where blood is collected, stored, or transfused sometimes enter the bottles through carelessness and contaminate the blood. Gram-positive saprophytes have produced only fever and no serious constitutional disturbances. Gram-negative saprophytes have been responsible for a type of overwhelming shock, which has frequently proved fatal.

All gram-negative bacteria implicated in transfusion reactions appear to be capable of utilizing citrate as the source of carbon. This is of importance because of the universal use of citrate as the anticoagulant and suggests that citrate may be responsible for the survival or growth of these organisms. Under experimental conditions the bacteria have been found to consume enough citrate during growth in the refrigerator to remove the anticoagulant and bring about clotting.

Bottles of blood may be contaminated with bacteria during any of three stages in the handling of the blood: during collection, because of bacteremia in the donor, ineffective antisepsis of the donor's skin, inadequately sterilized bottles, or drawing contaminated air into the vacuum bottle; during storage, because of the withdrawal of blood from the bottle by means of contaminated syringes or defects in the seal; or during transfusion through the use of contaminated equipment.

Little is known of the exact mechanism responsible for the overwhelming hypotension and shock in bacterial transfusion reactions. Available experimental and clinical observations indicate that bacteremic shock, unlike traumatic shock, is not accompanied by a significant reduction in blood volume.

The dominant symptoms occurring in cases of reaction after transfusion of blood contaminated with gram-negative bacilli are fever, hypotension, and pain. Active treatment is directed at early recognition of the syndrome and correction of the bacteremia and hypotension. The bacteremia is treated by an initial intravenous injection of 1 gm. of tetracycline. An additional 2 gm. are given intravenously during the first 24 hours. In addition other antibiotics that are effective against gram-negative bacilli may be used.

The continuous intravenous administration of levarterenol is instituted at the time that antibiotics are started in the treatment of the hypotension. In addition to antibiotics and pressor drugs cortisone and related steroids have been given to patients with bacteremic shock. Electrolytes lost through vomiting and diarrhea should be replaced; whole blood or plasma may be used if hemorrhagic manifestations are prominent.

Two procedures can be depended upon to prevent the transfusion of grossly contaminated blood:

1. Microscopic examination of the blood by direct smear just before the transfusion is started.
2. The routine use of tetracycline in concentrations of 20 mgm. per liter.

These procedures should be considered for adoption, especially under the conditions that may be encountered in civil catastrophes or war.

—*Gordon Madding, M.D.*

MISCELLANEOUS

Study on the Effect of Streptokinase-Activated Plasmin (Fibrinolysin) on Clots in Various Stages of Organization. Nathan Back, Julian L. Ambrus, C. Lenore Simpson, and Sidney Shulman. *J. Clin. Invest.*, 1958, 37: 864.

The authors report a continuation of earlier studies on the quantitative recording of the lysis of thrombi and emboli produced with I^{131} labeled fibrinogen. The preparations referred to as "plasmin" contained a variety of enzymes, including those with fibrinolytic and proteolytic activity, and were able to activate the fibrinolysin system. The dogs were given 5 daily treatments of 30 plasmin units (Loomis) per kgm. of human plasmin and this completely lysed clots less than 3 days old but did not have any effect on those more than 3 days old.

Histologic examination revealed that 3 days after formation, the clot was already largely separated from the blood stream by an endothelial layer of cells, thus preventing plasmin from reaching the clot.

On the basis of these findings it is suggested that better therapeutic results may be expected from the intravenous administration of plasmin in acute rather than chronic thromboembolic disorders.

—*Gordon Madding, M.D.*

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE; POSTOPERATIVE TREATEMENT

Mouth to Mouth Versus Manual Artificial Respiration for Children and Adults. ARCHER S. GORDON, CHARLES W. FRYE, LLOYD GITTELSON, MAX S. SADOVE, and EDWARD J. BEATTIE, JR. *J. Am. M. Ass.*, 1958, 167: 320.

THE AUTHORS compare direct mouth-to-mouth resuscitation to manual push-pull technique in controlled human tests. These methods included the back-pressure arm-lift, backward-pressure, hip lift, and chest pressure arm-lift methods; also the manual rocking-method was used with the patient in both the prone and supine position and with varying degrees of rocking. Tidal volumes were measured. The various techniques were performed both with and without an endotracheal airway. The airway pressure differentials were measured in a static system on patients who had endotracheal intubation. Patients were made temporarily apneic following hyperventilation and small doses of succynchole. The tests were made on unconscious infants, small children, and adults.

These studies have indicated the unequivocal superiority of mouth-to-mouth resuscitation over all manual methods in all age groups. Mouth-to-mouth breathing is the only technique which assures adequate ventilation in all cases. Complete obstruction of the airway occurred in a significant number of patients with the manual methods and partial airway obstruction was noted in all the other patients who received manual resuscitation. The most important single factor in assuring adequate ventilation is proper extension of the neck and elevation of the jaw.

—*Mary Karp, M.D.*

Respiratory Function in the Postoperative Patient. GEORGE J. MASTIO and FRANK F. ALLBRITTEN, JR. *Arch. Surg.*, 1958, 76: 732.

THE AUTHORS have made a study to evaluate respiratory adequacy in the postoperative period. Studies made on anesthetized patients indicate that an adequate volume of pulmonary ventilation and total absorption of carbon dioxide are requisites for the prevention of respiratory acidosis. Oxygen desaturation seldom occurs in the presence of the high partial pressure of oxygen generally used with anesthetic gases. The altered physiologic state does not end abruptly when the patient leaves the operating room, however. The usual physiologic responses may remain obtunded by medicaments used preceding, during, and after operation. When the patient is again exposed to the ambient atmosphere, the partial pressure of oxygen is generally low as compared with that of the anesthetic gas mixture. The problem of oxygenation may supersede that of carbon dioxide elimination. The authors then describe their technique for arriving at the figures used in this study. They collected expired gas samples and arterial blood samples for oxygen and carbon dioxide content determinations as well as *p*H determination in the latter. Also oxygen content, oxygen capacity, and carbon dioxide content of whole blood were determined. The day prior to operation base-line values for alveolar ventilation, carbon dioxide pressure, arterial *p*H, base bicarbonate, and oxygen saturation were obtained. Similar determinations were made on all subjects at the end of the operative procedure immediately prior to endotracheal extubation while still in the operating room, 30 minutes later in the recovery room, on the morning of the first postoperative day, and at other selected times in the postoperative period.

Patients were chosen because they were undergoing major abdominal or thoracic procedures, and not because of any impairment of their cardiorespiratory system. The average and median values of the carbon dioxide pressure were tabulated and the preoperative control average was 41.7 mm. of mercury, while the average value at the end of operation was 49.5 mm. Hg. A further increase occurred in the 30 minute time interval between the operating room and the recovery room. In general the carbon dioxide pressure reverted toward normal. By the morning of the first postoperative day most values for the pressure were not significantly altered from preoperative control levels. The carbon dioxide retention during the surgical procedure when compared with control values of carbon dioxide pressure was significant. Arterial *p*H values during these same intervals of study confirm acidosis during the operative procedure. On the morning of the first postoperative day *p*H values were still below preoperative control levels. Arterial blood buffer base values indicate a metabolic acidosis occurred during surgery and was significantly persistent on the first postoperative day. In spite of the early correction of the carbon dioxide pressure values in the postoperative period, continued higher levels of fixed acids remained, and confirmed the decreased *p*H values which were present throughout the period of study.

Arterial oxygen saturation fluctuated greatly. The average control value was 95.2 per cent. At the end of the operative procedure the average was considerably higher; at this time all patients were receiving high partial pressures of oxygen. A short time later in the recovery room, this oxygen excess was quickly lost, and average values were below control levels. Some values were depressed to extremely low and cyanotic levels. By the first postoperative day further oxygen desaturation occurred and coincided with depressed effective alveolar ventilation at that time.

Postoperative oxygen desaturation is a prominent finding in this study. This occurrence can go unrecognized, for clinical cyanosis is consistently recognizable only when arterial blood saturation is in the range of 75 per cent. In all patients some degree of oxygen desaturation was present on the first postoperative day, and in general is inconsistent with optimal conditions for response of the patient to the surgical procedure and eventual recovery.

Effective alveolar ventilation is often diminished by respiratory splinting due to pain, positioning, and frequently by large cumbersome dressings. Inherent changes of the alveolar membranes secondary to inhalant gases and mechanical pulmonary distention, as well as tracheal edema secondary to intubation, are frequent sources of respiratory difficulties in the early postoperative period. These changes, which are most frequently quite subtle, can go unrecognized and leave the patient anoxemic for extended periods. Large doses of narcotics poorly timed often aggravate this respiratory deficiency, but proper dosage at a time of maximum pain and apprehension can improve pulmonary ventilation.

Respiratory acidosis accompanied metabolic acidosis throughout the period of study. Metabolic acidosis not only accompanied the surgical operation but persisted into the early postoperative period. It appears that changes toward normalcy correlate well with the return of carbon dioxide pressure levels to normal ranges. Adequate alveolar ventilation in the postoperative period assures proper oxygenation, normal carbon dioxide pressure and diminution of the secondary metabolic acidosis. —*Donald M. Clough, M.D.*

Changes in the Blood Volume and Blood Composition of Patients Undergoing Brain Operations (Die Veraenderungen des Blutvolumens und der Blutzusammensetzung bei hirnchirurgischen Eingriffen). FRIEDRICH PAMPUS. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1958, 288: 135.

DEVELOPMENT of cerebral edema after brain operations is favored by circulatory disturbances and changes in the composition of the blood. General and central regulation of circulation may be affected by the pathologic process, operative trauma, changes in intracranial pressure, and temperature, anesthesia, or postoperative shock.

The determination of blood volume before and after operation does not furnish exact data as to the loss of blood because only the amount of circulating blood is taken into consideration. As a rule, reserve spaces are filled with blood before the operation whereas they are partially empty after the procedure.

The author determined the active blood volume in 40 fasting patients the day before the operation and under the same circumstances on the first postoperative day. The differential hemolysis method was employed.

Approximately 50 per cent of the patients had a reduced total blood volume preoperatively. The qualitative participation of erythrocytes and plasma volume in the total deficit was variable according to the etiology of reduction of blood volume. The disorders are attributable to changes in the autonomic nervous system, to permeability of blood vessels, and to external as well as internal hemorrhages.

Fifteen per cent of the patients were able to replace the entire blood loss from endogenous reserves following the operation and 30 per cent could replace losses in erythrocytes or plasma in the same manner.

In spite of replacement therapy the percentage of patients with blood volume deficiency rose from 50 before the operation to 70 during the postoperative period.

Qualitative and quantitative changes of intravascular contents have an untoward effect on the regulatory mechanism of circulation, cardiac efficiency, and nutrition of tissues, and thus reduce the chances of recovery. Hypoxia, hypercapnia, acidosis, and disturbances of the water and electrolyte balance predispose to cerebral edema. They can be combated by the inhalation of oxygen and the administration of plasma, electrolytes, glucose, amino acids, calcium, parathormone, and vitamins A and C.

—*Joseph K. Narat, M.D.*

Myocardial and Cerebral Infarctions as Postoperative Complications. KEITH D. J. VOWLES and JOHN M. HOWARD. *Brit. M. J.*, 1958, 1: 1096.

IMPROVED TECHNIQUES of surgery and anesthesia, and better preoperative and postoperative care have decreased or eliminated many serious complications following surgical operations. While older patients are being submitted more often to major surgical procedures, myocardial infarction and cerebrovascular accidents still constitute frequent serious or fatal postoperative complications, and these are often casually assumed to be nonpreventable and inevitable.

A series of 30 patients in two Atlanta, Georgia, hospitals, who sustained a myocardial infarction or cerebrovascular accident within 30 days after operation or accidental trauma during 1956 and '57, was studied. The average age of 19 patients who had myocardial infarcts was 70 years, and of the 11 who had cerebrovascular accidents it was 66 years. The sex incidence was 5 males to 1 female in the cardiac group, and 2 to 1 in the other group. In the cardiac group, 63 per cent had definite evidence of serious pre-existing heart disease before operation or trauma. Of the patients who subsequently developed a cerebral complication, 45 per cent had preoperative evidence of cerebrovascular disease other than mild hypertension. In retrospect, it was observed that about two-thirds of these patients might have been expected to develop one of these complications. Only 7 of the 30 patients were termed "good risks" for anesthesia and surgical operation.

There appear to be certain differences in the two processes which were studied. Of the myocardial infarctions during the 30 day period following surgical or accidental trauma, 63 per cent occurred within the first 3 weeks, and all but 23 per cent in the first week. The cerebrovascular accidents occurred without apparent predilection as to time. A period of hypotension was known to have existed during operation in 53 per cent of the group, and reduced coronary blood flow in arteriosclerotic patients is held to be a major factor in progressive ischemia. The complications were not attributable to specific anesthetic agents or to location of the trauma (cardiac and cerebral operations being excluded).

In 8 of the patients local anesthesia was used, and in one patient no anesthetic was used for a fractured humerus. General anesthesia may actually protect the brain to some extent by reducing its relative oxygen demand, so that postoperative factors such as atelectasis, narcotic respiratory depression, and postural changes may also be implicated in causing cerebral oxygen deficit.

An important concept to be stressed is that these two complications need not be inevitable. The avoidance of anoxia, hypotension, and increased cardiac work in arteriosclerotic patients during and after operation may prevent myocardial infarction. The biological and clinical factors involved in the causation of cerebrovascular accidents seem less specifically related to the period of trauma. However, attempted prevention of these accidents requires empirical use of adequate oxygenation, inhalation of carbon dioxide, and avoidance of heavy sedation in old and arteriosclerotic patients.

—Emile L. Meine, Jr., M.D.

Complications Following the Use of Indwelling Catheters in the Inferior Vena Cava. GUSTAV BANSMER, DONALD KEITH, and HENRY TESLUK. *J. Am. M. Ass.*, 1958, 167: 1606.

REPORTED COMPLICATIONS following the use of indwelling polyethylene catheters in the inferior vena cava are local thrombophlebitis, thrombosis with embolism, suppurative thrombophlebitis with septicemia, chemical necrosis from the infusion of irritating solutions, and transient ischemia of the leg. Catheters have been left in place as long as 131 days. Complications are frequent enough to be alarming.

The authors review their experience with complications in 11 of 24 cases coming under observation in one institution. The incidence of complications is greater than the previous literature has indicated. Three of the cases were fatal.

While employment of the catheter may be necessary and life-saving, peripheral veins should be used initially, even for hypertonic solutions. The femoral catheter should not be used for the physician's convenience, in the presence of phlebitis, or when there is pelvic inflammation or pelvic peritonitis. Rigid asepsis should be used when the catheter is inserted. A continuous flow of fluid should be maintained as thrombi tend to form at the tip of the catheter rather than at the site of insertion. The catheter should be removed as early as possible. Irritant and sclerosing solutions should be avoided. *—Carl Calman, M.D.*

Effects of Varying Infusion Time in Maintenance Fluid Therapy. O. NEYZI, M. BAILEY, and N. B. TALBOT. *N. England J. M.*, 1958, 258: 1239.

THE EFFECTS of shortening the period of administration of a standard maintenance dose of dextrose-containing, multiple electrolyte solution from 24 to 12 and to 6 hours was studied on 3 pairs of volunteers.

The conclusions reached were that it is physiologically safest to give patients requiring parenteral fluid maintenance therapy their daily allotment in a continuous manner. Fortunately, it is practically possible to do so in patients of all ages. Although reduction of the period of administration to 12 or even to 6 hours each day, with 12 to 18 intervening hours of fasting and thirsting, may not result in the development of important metabolic disturbances in adults with normally functioning homeostatic mechanisms, it may do so in infants and small children and in older children and adults whose homeostatic capacities have become markedly impaired.

—W. Foster Montgomery, M.D.

A Critical Evaluation of Polyvinyl Sponge (Ivalon) as a Vascular and Tissue Substitute. THOMAS W. JONES, JOHN K. STEVENSON, JOHN E. JESSEPH, and HENRY N. HARKINS. *Am. Surgeon*, 1958, 24: 401.

IVALON can be a valuable aid to the surgeon in the following ways:

1. Abdominal aortic grafts.
2. Aortic grafts in growing patients.
3. Bypass grafts between arteries that are more than 7 mm. in diameter.
4. Bypass grafts as temporary shunts to facilitate aortic surgery.
5. As a hemostatic agent in the repair of wounds of the liver and kidney.
6. Repair of tissue defects, especially in the diaphragm.

Ivalon can be of limited and temporary value as a tracheal prosthesis.

Ivalon as yet appears to be of no value in permanent blood vessel grafts less than 7 mm. in diameter, in blood vessel grafts in areas of low blood flow rates (large veins and small arteries), and as an esophageal prosthesis. *—John J. Maloney, M.D.*

New Forms of Hospitalism and Methods of Combating Them (Neue Formen von Hospitalismus und ihre Bekaempfung). H. KUNZ. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1957, 287: 57.

THE TERM "hospitalism" refers to the damage and risks which can result from the sojourn and treatment of patients in a hospital. Numerous allergic reactions have been reported and these take first place among undesirable side effects of antibiotics which present the problem frequently referred to as "new hospital diseases." Rarely are these a threat to life although 50 cases of death have been collected from the literature in which there was anaphylactic shock after the repeated use of penicillin.

There has been a rapid increase in the pathogenic agents resistant to antibiotics, especially resistant staphylococci. These have somewhat lessened the value of antibiotics and, furthermore, numerous concomitant infections with resistant bacteria and fungi have been observed in the course of antibiotic therapy. A study by Zischka from the pathological institute of the University of Vienna, Austria, reveals that the frequency of resistant staphylococci and other bacteria has become somewhat stationary although there has been a disquieting increase in strains in the coli group which are resistant to supronal, a proprietary sulfonamide compound.

An additional risk for hospitalized patients may be the masking of clinical symptoms caused by antibiotic therapy.

There is an additional problem for the surgeon in the high percentage of antibiotic resistant organisms found on the skin and in the nasopharynx of hospital personnel and in the air and dust in the hospital wards. Reports in the literature confirm the fact that resistant staphylococci can cause epidemic furunculosis and other pyogenic infections and also severe operative wound infections which may result in death. The terms "staphylococci hospitalism" or "modern form of hospital gangrene" have been proposed.

Postoperative enterocolitis has been reported with a stormy, acute course and superinfections with resistant staphylococci, especially in the course of treatment with aureomycin and terramycin. At the surgical clinic of the University of Vienna, 60 cases of postoperative enterocolitis were observed between 1949 and 1956, and 39 (65 per cent) of the patients died. In the surgical department of the hospital in Vienna-Lainz, 28 cases of postoperative enterocolitis occurred and 15 (53 per cent) of the patients died.

To combat these "new forms of hospitalism" the urgent request is made that antibiotics be limited in their application as much as possible. One should not neglect the measures of asepsis by too much confidence in the prophylactic effect of the antibiotics; in fact, the high incidence of antibiotic-resistant virulent strains found among hospital personnel makes it necessary to raise the standards of asepsis and to pay particular attention to the air and droplet infection. The author believes that the postoperative enterocolitis may be combated by abandoning the use of antibiotics for the preoperative disinfection of the intestines and using only sulfonamide preparations which are more difficult to absorb. When postoperative enterocolitis does occur, erythromycin should be given and shock combated by the administration of desoxycorticosterone acetate and antiallergic preparations.

Despite the apparent increase in hospital infections the records of the anatomicopathologic institute of the University of Vienna show a decline in deaths caused by various pyogenic infections. Of 2,031 autopsies performed in 1950, the total number of septic complications was 204 and of these 71 were phlegmons, erysipelas, sepsis, and pyemia with 133 cases of peritonitis. Of 2,388 autopsies performed in 1955, the total number of septic complications was 127 and of these 33 were phlegmons, erysipelas, sepsis, and pyemia and 94 were peritonitis. There is no doubt in the minds of the author that the antibiotics have been responsible for this decrease.

—*W. Harrison Mehn, M.D.*

ANTISEPTIC SURGERY; TREATMENT OF WOUNDS AND INFECTIONS

Treatment of Complete Scalping Injury (Beitrag zur Behandlung voelliger Skalpierung des Schaedels). J. Kudr and M. Mihola. *Zbl. Chir.*, 1958, 83: 686.

The increasing industrialization and factory-employment of female labor has made complete scalping injury a more frequent occurrence. One such case which was treated by immediate transplant of the completely avulsed scalp is presented in the paper. A 45 yr. old female was scalped one hour prior to her admission. Her hair had been caught in a machine. On admission there was practically no bleeding. The scalping was complete—reaching from the base of the nose along a line somewhat above the eyebrows, the zygoma, and above the ears to the occiput. The pericranium was exposed but was not traumatized. The scalp was delivered with the patient; it was grossly dirty, dried, and lacerated. The skull was rinsed with an antibiotic solution; the scalp was cleansed carefully and fitted over a rounded pot of 3,000 c.c. capacity (always kept with the surgical supplies for such emergencies). Then the galea and the subcutaneous fat were trimmed off with a Thiersch knife. The scalp in the form of a dermoepidermal transplant was sutured to the skin edges. Penicillin solution was used freely topically. A few incisions were made in the transplant for drainage. A vaseline gauze compression dressing was applied. A complete take of the transplant was observed and partial growth of hair was seen.

Rarely, scalping occurs in a plane above the galea through the subcutaneous fat. It should not present any additional surgical problems. If the pericranium is lost, it is advisable to make multiple drillholes in the tabula externa ossis cranii to promote granulations.

—*Gunars Medins, M.D.*

Nosocomial Infection with Erythromycin-Resistant Staphylococci in a Burns and Plastic Surgery Unit. Kristina Wickman. *Acta chir. scand.*, 1958, 114: 490.

This report deals with the origin and spread of erythromycin-resistant staphylococci in the ward when 2 patients who had sustained severe burns were treated with erythromycin. A brief historical review is given which pertains largely to the fact that an increasing number of staphylococcal strains resistant to penicillin and other antibiotics are being encountered. The author noted that resistant strains emerged fairly quickly and were soon spread over the ward despite isolation and other hygienic precautions.

Dissemination seemed to occur from patient to patient by way of the staff, through cleaning and treatment utilities, and through the air. From sedimentation plates the resistant staphylococci could be recovered as late as 5 months after the erythromycin treatment was stopped.

The combatting of infections in the hospital units of the type from which this report originated must be carried on in two ways; (1) hygienic measures and (2) restriction with antibiotics, the latter being resorted to only on sound bacteriologic and clinical indications. In addition, one or two agents should be reserved for use against severe infections which show resistance to the "ordinary" antibiotics.

—*Gordon Madding, M.D.*

Application of Antibiotics (Polybactrin) in Surgical Practice, Using the Aerosol Technique. R. Myles Gibson. *Brit. M. J.*, 1958, p. 1326.

Because of the number of infections occurring in elective surgical operations which are becoming increasingly resistant to the broad spectrum antibiotics, the author has prepared an aerosol which he used in a number of neurosurgical cases. Although there are a number of factors and sources for infection in surgical patients, in the last analysis surgical infection is caused by the implantation of pathogenic organisms into the exposed wound at the time of operation.

The aerosol used by the author consisted of a mixture of polymyxin, bacitracin, and neomycin which antibiotic triad, labeled "polybactrin," was used in the series under study. It was applied locally for prophylaxis. The method of preparation and technique used are also given. A clinical trial is reported in which this technique was applied in 250 consecutive

neurosurgical operations, and is contrasted with a comparable series in which "polybactrin" was not used.

The analysis showed a reduction of the instances of major sepsis from 7.2 to 0.4 per cent and in minor sepsis from 1.2 to 0.8 per cent when the prophylactic "polybactrin" was used. —*Gordon Madding, M.D.*

Buccally Administered Streptokinase; Clinical and Experimental Observations. IRVING INNERFIELD, HAROLD SHUB, and LINN J. BOYD. *N. England J. M.*, 1958, 258: 1069.

A STUDY was undertaken to ascertain whether the buccal route for administering streptokinase could eliminate or significantly modify undesirable features associated with the intramuscular administration of enzymes.

The Ouchterlony data, as described in the article, provide immunologic evidence that streptokinase given buccally in tablets did traverse the mucosal barrier (although mucosal penetration of the actual anti-inflammatory factor was not immunologically proved). Antistreptokinase antibodies failed to increase in the serums of 14 patients during a 4 week control period, but did increase and strengthen in 10 of the 14 a few weeks after buccal streptokinase therapy was started. Elevated antithrombin levels were also noted in 23 of 27 serum determinations made on the same 14 patients. Anti-inflammatory effects, as in chronic leg ulcer, bronchiectasis, chronic bronchitis, and migratory phlebitis, correlated well with the elevations in serum antithrombin levels.

The exact mechanism underlying the anti-inflammatory or thrombolytic effects of proteases, irrespective of the administrative route, is still speculative. There were no local side effects and the only systemic side effect was an occasional mild gastrointestinal disturbance.

The authors believe this study provided experimental and clinical evidence of mucosal penetration, increased serum antithrombin activity, and a degree of anti-inflammatory effect after the buccal administration of streptokinase.

—*Stephen W. Carveth, M.D.*

Some Comments Concerning the Prognosis of Tetanus (Einige Bemerkungen zur Prognose des Tetanus). H. IMDAHL and U. GÖTT. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1958, 288: 162.

WITHIN a 30 year period 43 patients with tetanus were treated in the Surgical Clinic of the University of Bonn.

Classification of the cases according to the course of the disease offers valuable therapeutic suggestions.

A slight form is characterized by circumscribed, single or plural phenomena, such as trismus, opisthotonos, risus sardonicus, or local muscular rigidity.

In the moderately severe form the aforementioned signs are supplemented by singular, nongeneralized convulsions or an occasional generalized convulsion.

In the severe form all the aforementioned signs are combined with frequent generalized convulsions.

The frequently emphasized relations between the incubation period and mortality do not exist. According to the authors' statistics, cures predominated in the slight form of tetanus while in the moderately severe group a 50 per cent mortality was recorded. The number of fatalities was greatest in the severe form, being independent of the incubation period. The authors admit, however, that in the slight form and the moderately severe form the expectancy of cure rises with the duration of incubation.

The incubation period offers no cue as to the course of the disease in regard to its gravity.

The term "invasion period" is applied to the time that lapses between the first manifest signs and the first convulsion. In the authors' study cures were obtained in 33 per cent of cases when the invasion period exceeded 4 days, and in only 9 per cent when that period was shorter than 4 days.

Proper sedation, combined with the administration of penicillin and large doses of antitoxin, appears to lengthen the invasion period.

A relatively long invasion period does not offer a guarantee against a fatal outcome, which occurs in rare instances.

The sooner the initiation of therapy with heavy doses of antitoxin and antibiotics, the better the prognosis. This statement applies to all groups of tetanus. The minimum dose of penicillin should be 1 million units per day. Early hospitalization in a separate department is highly desirable because detailed records must be kept, and great attention paid by specially trained personnel to the maintenance of water and electrolyte balance, intermediate metabolism, liver function, blood coagulation, and pulmonary complications. The latter were responsible for 70 per cent of all fatal cases in the authors' material.

—*Joseph K. Narat, M.D.*

Experiences in the Treatment of Tetanus: Report on 12 Patients Treated During the Last Year (Erfahrungen in der Tetanusbehandlung; Bericht ueber die im letzten Jahr behandelten 12 Faelle). H. STIRNEMANN and R. BRÖNNIMANN. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1957, 286:335.

THE REPORT concerns 10 patients with severe tetanus and 2 patients with mild tetanus treated at the surgical clinic in Bern, Switzerland since 1956. Seven of these patients were adults (2 men and 5 women) between the ages of 44 and 69 and 5 of the cases were children (3 boys and 2 girls) between the ages of 2 and 13 years. Four of the 12 patients died within 1 to 27 days after the onset of symptoms, the remaining 8 patients recovered.

Immediately after tetanus is proved and diagnosed the patient should be given tetanus antiserum by the intravenous route; 10,000 to 20,000 units in severe cases and not more than 3,000 units in suspected cases. Active immunization with anatoxin or aluminum hydroxide adsorbed tetanus toxoid should be carried out later in the disease since patients who have recovered from tetanus have not acquired immunity. Extensive radical excision of suspected areas at the point of entrance is imperative. Additional measures to be noted would include tracheotomy, curarization, use of a respirator, and administration of specific drugs.

The first 9 of the 12 patients treated received prophylactic antibiotic and sulfonamide preparations

but these were omitted in the last 3 patients. Chemotherapy is indicated only when there is a pneumonic process, septic phlebitis, or peritonitis. Neither pneumonia nor atelectasis occurred in the patients in whom chemotherapy was omitted; the use of a respirator and adequate removal of the tracheal secretions was considered adequate to obtain this beneficial result. Hypopotassemia was observed in all patients and therefore 1 to 3 grams of potassium chloride should be given daily with control of the serum level. Sedation was effected in the first 2 patients by artificial hibernation with the aid of such drugs as phenergan, largactil, demerol, and large amounts of succinylcholine. These patients showed the effects of deterioration with generalized intoxication, tachycardia, and poor peripheral circulation. The last 4 patients treated were given only small amounts of phenobarbital and meperidine hydrochloride in addition to a curare preparation. These patients were alert enough to remember their course but not in an unpleasant manner. Blood and plasma transfusions were given in some instances. Alimentation was considered important and usually was effected through the use of a small nasal stomach feeding tube. In 2 cases gastrostomy was performed for feeding purposes. Gastrostomy is indicated initially or after one to two weeks at the latest. Diet should be rich in calories and vitamins. Heat regulation has been controlled in the curarized patients by physical means including exposure, fan, wet compresses; 2 patients were immersed in a cool bath.

In 2 patients with severe types of tetanus, reversible paralysis, tetraplegia, and paralysis of the esophagus, occurred after prolonged treatment with succinylcholine. The massive tetanus intoxication and cool baths probably favored the occurrence of this complication. Both patients recovered completely. The well known posttetanic facial paresis was observed in a third patient and a generalized spastic-paretic state occurred in a fourth patient after withdrawal of the curare preparation. This subsided after several weeks of mechanotherapy.

Despite the successful treatment of patients with tetanus in which there has been a short incubation period following artificial hibernation or curarization, with or without artificial respiration, the problem of tetanus therapy has not yet been completely solved. Methods for treatment are still only symptomatic. —*W. Harrison Mehn, M.D.*

Effect of Chlorpromazine on Muscle Spasm in Human Tetanus. MARGARET N. BARR. *Lancet*, Lond., 1958, 1:991.

THE AUTHOR reported a case of tetanus in an 11 year old girl in whom muscle spasm, limited to the jaw and one leg, was immediately and unequivocally reduced by chlorpromazine. These local manifestations facilitated the study of the effect of drugs and disturbance on muscle spasm. Chlorpromazine modified the spasm by relieving trismus, and enabled the patient to eat a normal diet and to remain conscious; full phenobarbital sedation had provided neither advantage. A further, although hypothetical, benefit might have been the decrease in contracture—a recognized sequel to local tetanus. In this patient the time taken for clinical recovery of the muscles compared favorably with the much longer periods, up to several months, reported by some clinicians.

The effect of the initial dose of chlorpromazine, given during deep phenobarbital sedation, was never matched by subsequent and larger doses. Thiopentone, given during the period of action of chlorpromazine, increased the interdental distance temporarily, but considerably. These facts suggest that a combination of phenobarbital and chlorpromazine might be superior to chlorpromazine alone. Full sedative doses of phenobarbital did not relieve the spasm, but chlorpromazine did so. —*Robert Turell, M.D.*

ANESTHESIA

Study of Narcotics and Sedatives for Use in Preanesthetic Medication. JAMES E. ECKENHOFF and MARTIN HELRICH. *J. Am. M. Ass.*, 1958, 167: 415.

THE PRESENT STUDY was undertaken to compare the effectiveness of three commonly used narcotics, morphine, meperidine, and secobarbital, and a placebo for preanesthetic sedation, and to determine the incidence of side reactions to each of these agents and observe the effect of the drugs upon the conduct of, and recovery from, anesthesia. The drugs were given as "blind" medication, coded so that the study was a "blind study." They were used in 1,400 patients. It was found that secobarbital led to a higher proportion of calm, carefree, yet alert patients than did the narcotics. The narcotics produced more drowsy or sleeping patients, but also a higher incidence of apprehension than did secobarbital and more undesirable side effects. There was little difference in the preanesthetic agent used on the incidence of satisfactory induction of anesthesia. However, the complications of the induction period varied according to the preanesthetic drug and the anesthetic agent.

Cough and laryngospasm were the common complications when thiopental was injected and secobarbital was the preanesthetic sedation. Coughing and excessive respiratory secretions were common after secobarbital medication, whereas unintentional apnea appeared frequently after narcotics had been given. Preanesthetic drugs did not appear to influence the maintenance of anesthesia. The emergence was more prolonged in those patients who had received narcotics than in those patients who had received secobarbital.

The continued routine use of narcotics for preanesthetic medication is unwise and unwarranted. Preoperative medication should be tailored to meet the needs of the patient and the operation.

—*Mary Karp, M.D.*

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Aortic Valvulography and Ascending Aortography. SIDNEY W. NELSON, WILLIAM MOLNAR, KARL P. KLASSEN, and JOSEPH M. RYAN. *Radiology*, 1958, 70:697.

PATIENTS UNDERGOING mitral commissurotomy occasionally do very poorly if there is a co-existing aortic valve lesion. Since, not infrequently, it is quite difficult if not impossible to distinguish clinically between the diastolic murmurs of aortic insufficiency and pulmonary valvular insufficiency (Graham Steell murmur), the authors in 1955 developed a method of thoracic aortography which permits an accurate differential diagnosis in this small group of patients. The method, which is called aortic valvulography, is well suited for the evaluation of aortic valvular function and can also be used for the study of lesions of the ascending aorta and coronary arteries. It consists of the injection of contrast material near the aortic valve region in concentrations adequate for accurate roentgenographic evaluation of pathologic regurgitation through the aortic valves into the left ventricle.

The technique of injection was first worked out in dogs. In planning their approach, the authors reviewed their own experience and that of others in the field of thoracic aortography. A detailed account of this review is given in the article and the various methods of thoracic aortography are illustrated by line drawings.

Later the method was used in patients who were being evaluated for mitral valvulotomy. The following is the procedure employed: The right carotid artery is surgically exposed through a small skin incision, and, after two cigarette drains are drawn beneath it, traction is applied delivering the artery into the wound. Then a tiny incision is made between the drains and a specially constructed No. 14 French tapered silk, closed-end, side-opening catheter is introduced into the ascending aorta in such a way that the catheter opening is about 3 cm. proximal to the aortic valve. As soon as the catheter is in the desired position, 30 c.c. of 90 per cent hypaque are injected in 2 to 4 seconds by means of an automatic device using a pressure of 5 kgm./1 cm.^{2}. The electrically controlled exposures are started simultaneously with the beginning of the injection and continued for 6 seconds. During the injection, traction is made upon the cigarette drain on the cephalic side of the injection site in the right carotid artery and the left carotid artery is compressed manually in order to diminish the amount of contrast material reaching the brain. To preclude further the danger of cerebral damage, each carotid artery is compressed continuously for 12 minutes on the day before aortographic examination, in order to detect any deleterious cerebral effect due to the relative anoxia so produced. The entire aortographic procedure takes 8 to 11 minutes.

The authors performed 51 transcarotid aortographic studies in 49 patients. Aortic insufficiency, aortic scarring due to syphilis, aortic valve vegetations, pulmonic valvular insufficiency, and pulmonary artery-aortic fistula have been clearly demonstrated. Aneurysms of the ascending aorta have been identified and their exact points of origin and relation to the coronary arteries and great vessels determined. The coronary artery circulation was often visualized and the nature of complicated cardiovascular disease clarified. It seems likely that the method will prove useful in other lesions, such as pulmonary artery-aortic septal defects, double aortic arch, or rupture of the sinus of Valsalva. Only two complications were encountered, one a transient left hemiparesis and the other a permanent left hemiparesis, occurring in patients of 72 years and 74 years of age respectively. There were no deaths.

The article is profusely illustrated with beautiful roentgenographic reproductions and accompanying line drawings of typical cases. —*T. Leucutia, M.D.*

Analysis of 140 Malignant Lymphomas Treated from 1928 to 1949 (Rendiconto clinico-statistico dei linfoblastomi maligni trattati dal 1928 al 1949). LUIGI RIGAT. *Radiol. med.*, Milano, 1958, 44: 438.

IN A preceding issue of this journal the author published a series of articles on malignant lymphoblastomas treated in the Institute of Radiology of the University of Milan, Italy, from 1928 to 1948. This article is concerned with those patients with Hodgkin's disease. Between 1928 and 1949 there were 140 patients with histologically proved Hodgkin's disease who received roentgen therapy at the University of Milan.

Of the 140 patients 59.2 per cent were male. The age of the patients ranged from 4 to 76 years with a maximum incidence in the third, fourth, and fifth decades. In 77.9 per cent of the cases the disease process was localized to the spleen and lymph nodes whereas in 14.3 per cent of the cases there was visceral involvement, most frequently of the lungs. The patients were divided into three groups according to the extent of the lesions, which were evaluated clinically. Stage 1 lesions were defined as those localized to one region of the body. Stage 2 consisted of lesions involving one half of the body whereas stage 3 consisted of the cases in which the entire body was involved. The percentages of patients with lesions classified as stages 1, 2, and 3 were 20 per cent, 54 per cent, and 25 per cent respectively. Eighty-one per cent of the patients that had, at the time of clinical evaluation, lesions that were classified as belonging to stage 1 had come under medical care during the first year following the onset of their symptoms. On the other hand, only 65 per cent of those patients with stage 2 lesions and 57 per cent of the patients with stage 3 lesions had come under medical care during the first year following the onset of their symptoms. In general, high doses of roentgen therapy were used and were given over wide portals in order to irradiate effectively not only the involved glands but also the surrounding tissues. One series of treatments was given to 42.9 per cent of the

patients, 18 per cent had 2, 15 per cent had 3, and only 1 per cent had 9 series of treatments. Teleroentgen therapy was used in only 5 patients all of whom had marked depression of the bone marrow.

The results of the follow-up of these 140 patients, undertaken in 1955, were as follows: of the 12 patients who were alive, 4 were clinically cured, 1 had evidence of active disease, and 7 could not be evaluated clinically. One hundred twenty-six of the patients were dead. In 112 of these the cause of death was malignant lymphoma, 12 died of unknown causes, and 2 died of unrelated disease. Two patients were lost to follow-up. The 3, 5, and 10 year survival rates were 30.7 per cent, 20 per cent, and 8.1 per cent respectively. The median survival rate, i.e., the time interval at which only 50 per cent of the group survived, was 16 months. The 3 and 5 year survival rates were definitely higher in the female patients, whereas the 10 year survival rate was slightly higher in the male patients. Patients with Hodgkin's disease involving the spleen and lymph nodes had 3 and 5 year survival rates that were higher than those in the patients with other forms of the disease. However, there was no significant difference between the 10 year survival rates of the two groups. When survival rates were examined in relation to the three stages of the disease in patients with involvement of the spleen and lymph nodes only, it was apparent that patients with stage 1 lesions had higher 3, 5, and 10 year survival rates than patients with stage 2 or 3 lesions. Of the 140 patients, 43 received their treatment before 1939 whereas 97 of the patients were treated between 1939 and 1949. The 3, 5, and 10 year survival rates were definitely higher in the patients treated after 1939. The median survival rate, however, was the same in both groups which would seem to show that improvements in technique have affected only the patients with a relatively benign form of the disease. —*R. Menguy, M.D.*

Miscellaneous

Preoperative Irradiation of Breast Cancer with Radioactive Colloidal Gold (Au^{198}). Masao Okuhara, Ryoichi Monma, Koji Onoda, Tomokichi Takeda, and Takashi Honda. *Am. J. Roentg.*, 1958, 79:988.

In this study, 8 patients with mammary carcinoma received injections of radioactive colloidal gold into the cancerous breast. Twenty to fifty millicuries in a concentration of 1 mc. per ml. were used and the substance injected in as uniform a fashion as possible throughout the breast.

In this group of patients, one had a slight fever for a few days and another pigmentation and erosion of the nipple. No blood changes were observed. No radioactivity was observed in the urine or blood.

Radical mastectomy was performed 2 to 3 weeks after the injection of the radioactive gold. At operation, a blackish-purple discoloration of the subcutaneous and fatty tissue was observed. It was also seen in the regional lymph nodes and was thought to represent deposition of the colloidal gold. The tissues were more fragile and had more of a tendency to bleed than those of the controls. Discoloration of the axillary lymph nodes facilitated their detection at the time of operation. In 2 cases in which metastases were found in the axillary nodes, the outer layer of the nodes was discolored with the colloidal gold and this surrounded the carcinoma which was found in the central part.

Postoperatively, fever was more persistent and the wound healing was more retarded than customarily.

Data resulting from observations and calculations revealed that by the intramammary injection of 50 millicuries of radioactive gold, the dose delivered in the central part of the breast is 7,500 to 15,000 reps of beta radiation and 1,370 to 2,250 $r\gamma$ of gamma radiation. About one-half of the axillary lymph nodes receive a dose of more than 7,600 reps of beta radiation and a dose of 257 4γ to 284 4γ of gamma radiation corresponding to the deposit of more than 100μc./gm. of gold in them. In addition, when the lymph nodes are not completely infiltrated with cancer cells, the radiogold can deposit in them and yield a dose up to 35,000 reps of beta radiation.

Study of the removed tissue by autoradiography and histologic section was carried out. In the histologic sections, multiple black particles were found which were mostly phagocytosed by histiocytes. These cells showed marked degeneration as evidenced by clumping and disintegration of the nucleus and vacuole formation. The particles were found to accumulate in the lymph vessels, around blood vessels, and in the stroma of the carcinoma. They were surrounded by a marked inflammatory reaction. These black particles were identified as gold particles by autoradiography.

In addition to the above changes, a panarteritis was noted, an endarteritis, and epithelial cell atrophy and degeneration. The cancer cells near these particles also participated in the injury. In some of the cases, the degeneration was so pronounced that cancer cells could hardly be identified. It is noted that all diagnoses were made by biopsy before injection of the radiogold.

In the lymph nodes, the gold particles were mostly phagocytosed by the sinus endothelial and reticulum cells which were chiefly located in the subcapsular regions, in the hilus, and in the reticuloendothelial pathways surrounding the follicles. The late result of the radiation and destruction of the follicles was necrosis and hemorrhage.

The gold particles in the lymph nodes with metastases remained in the lymph spaces around the tumor mass and were not observed in the compact mass of cancer cells. The cells in the vicinity of the gold particles showed the characteristic picture of radiation effect. —*John J. Bergan, M.D.*

The Treatment of Lung Cancer (Primary and Metastatic) by Radioactive Phosphorus Administered Intravenously, Intra-Arterially, and Intracardially. Irving M. Ariel. *Am. J. Roentg.*, 1958, 79:961.

The author describes experiences gained from attempts to obtain palliation in patients with inoperable cancer of the lung. Both patients with primary bronchogenic carcinoma and those with metastases to the lung from some other source were included.

In this study, internal irradiation with radioactive phosphorus was chosen as the therapeutic modality

in order to study a method of administering radiation without subjecting the patient to the rigors of a thoracotomy or external radiation. The radioactive phosphorus was given intravenously in a dose of 5 mc. If the patient was well enough, a second dose of 5 mc. was given at the end of one week.

In all instances, the patients were ambulatory but all other forms of therapy had been exhausted. The diagnosis was established by biopsy in almost all instances. In those patients in whom the intracardiac route was investigated, a polyethelene catheter was inserted in the antebrachial vein and the phosphorus delivered into the right auricle. In those patients in whom the intra-arterial route was investigated, a catheter was placed in the femoral artery and threaded into the thoracic aorta. The phosphorus was delivered into the aorta in the hope that the bronchial arteries would carry the isotope directly to the tumor in the lung.

Ten patients were treated who had primary lung cancer. Eight of these had bronchogenic carcinoma, one had a malignant bronchial adenoma, and another was a 14 year old boy with a neuroblastoma of the mediastinum which infiltrated the left upper lobe of the lung. One of the patients with bronchogenic carcinoma survives one year after treatment, the remaining 7 have succumbed to the disease. It is concluded that the patients enjoyed no increased longevity from the treatment although a number of the patients had a variable relief of symptoms for a transient period of time. There was no significant change in the blood picture in these patients and the roentgenographic studies revealed no changes.

Of 10 patients with breast cancer which was metastatic to the lung, 8 succumbed an average of 5 months after treatment. Two patients remain alive and relatively free of symptoms at 12 and 18 months after treatment. No effects were noted on the roentgenograms in this group of patients and no significant diminution occurred in either the white or the red cell counts.

Nine patients were studied who presented metastases from the female genital tract to the lungs. Of the 5 with ovarian carcinoma, all died an average of 2 months after isotope therapy. No alteration was observed in the chest roentgenograms. Of the 4 patients with uterine cancer, 3 died an average of 7 months after treatment, and one is alive with a huge liver metastasis.

Nine patients were studied who had metastases to the lungs from carcinomas of the colon and rectum. One of these was lost to follow-up; 8 died an average of 4 months after treatment with the isotope. No beneficial effects were noted on the roentgenograms. Seven of the patients received no symptomatic relief from the therapy.

Other patients were studied with carcinomas from various sites. Four patients had primary carcinoma in the kidney, 1 a seminoma, 3 sarcomas, and 5 had an unknown primary carcinoma. Of these, the patients with the sarcomas benefited most and had the greatest alleviation of symptoms. One patient with an unknown primary carcinoma obtained great relief of symptoms for a period of 8 months.

In studying the percentage of pick-up of the radioactive phosphorus by the lung tumors, it was concluded that a quantity of the isotope is concentrated by the tumor tissue within the lungs. This is also true of the carcinomas metastatic from the breast.

The effects of combining radioactive phosphorus therapy and therapy with nitrogen mustard were studied. No significant enhancement of the concentration of the P^{32} by a preliminary course of nitrogen mustard occurred but the fluctuations in data are so great that no definite conclusions can be drawn.

No significant differences were noted between the intravenous and the intra-arterial route.

The data presented indicate that the use of radioactive phosphorus as a means of treating pulmonary cancer is limited to the alleviation of symptoms. In only one of the cases studied was there any evidence which indicated that prolongation of life might have occurred. No serious untoward effects were noted which were the result of the isotope therapy.

—*John J. Bergan, M.D.*

Malignant Melanoma; A Combined Surgical and Radiotherapeutic Approach. ROBERT J. DICKSON. *Am. J. Roentg.*, 1958, 79:1063.

THE AUTHOR made a statistical study to evaluate the results obtained in malignant melanoma treated by combined surgery and postoperative irradiation, as advocated by the late Riccards, Director of the Ontario Institute of Radiotherapy at Toronto General Hospital. To this end, he reviewed all case histories in the tumor registry of that hospital as well as the records of the radiotherapy department of Johns Hopkins Hospital and of the tumor registry of the Public Health Service Hospital in Baltimore. The cases which had not been treated in this fashion were used for comparison of the end results. Prepubertal melanoma and melanoma of the uveal tract were excluded, as were a few cases in which the histologic diagnosis was considered doubtful by any independent pathologist. The total number of cases finally found acceptable was 254, consisting of 188 from the Toronto General Hospital and 66 from the two hospitals in Baltimore.

The age and sex incidence, as well as the body distribution of the malignant melanoma in these cases, were tabulated and compared with selected series from the literature.

The staging was done according to Sylvén: stage 1—localized melanoma confined to the skin, local recurrences and near-by deposits in cutaneous lymphatics being included; stage 2—cases with regional lymph node metastases confined to one gland station only; stage 3—metastatic involvement of two or more lymph nodes, and cases with distant metastases evidencing a generalized tumor process.

The treatment at the Toronto General Hospital consisted, with a few exceptions, of wide excision of the primary tumor and the immediate lymph drainage areas in stages 1, 2, and occasionally 3, followed by postoperative irradiation. In the series from the two Baltimore hospitals, a few patients were treated by surgery and postoperative irradiation, but the majority received irradiation only for palliation when the disease had recurred after surgery. Stage 3 lesions were treated by palliative irradiation alone.

TABLE I—FIVE YEAR SURVIVAL RATE

Type of treatment	*Total*	*Survived*	*Rate*
Wide surgery	42	11	26.2%
Local therapy	71	14	19.7%
Radiation therapy	121	50	41.3%
Total cases	234	75	32.0%

Standard Error ±10.3 per cent.

The irradiation was carried out with radium and roentgen rays in almost equal frequency. The radium techniques included surface molds or interstitial implants for the primary lesion (the dose being unspecified in most cases) and teletherapy for the metastatic sites, the dose here varying between 4,800 roentgens and 6,500 roentgens in 4 to 6 weeks. The factors of the roentgen ray techniques were 100 kv. radiation to a dose of 5,000 roentgens in 10 days to the primary lesion and 200 or 400 kv. radiation to an estimated tumor dose of 4,000 roentgens to 5,000 roentgens in about 5 weeks to the lymph node bearing areas. In other instances high voltage radiation was used also for the primary lesions.

Of the entire series 234 cases were available for analysis of the end results, all having been traced until death, for at least 5 years if still alive, or until lost to further follow-up examination. These results are shown in Table I.

As may be seen, a 5 year survival rate of 41 per cent was achieved in 121 cases treated by surgery and postoperative irradiation or by palliative irradiation only.

The conclusion is reached that wide excisional surgery associated with adequate postoperative irradiation yields a higher 5 year survival rate than surgery alone. This procedure constitutes a satisfactory alternative to ablative and deforming operations. —*T. Leucutia, M.D.*

An Examination of the Clinical and Experimental Data Relating to the Possible Hazard to the Individual of Small Doses of Radiation. L. F. Lamerton. *Brit. J. Radiol.*, 1958, 31: 229.

In the introduction to his presidential address, which was delivered at the British Institute of Radiology on March 20, 1958, the author states that it would seem that preoccupation with the hazards of radiation, particularly on the part of the general public, is a recent development. However, as early as 1904, Dr. Thurstan Holland, in his presidential address, found it necessary to say in referring to certain articles of the period that ". . .These articles in the daily press are calculated to do harm, as many of the general public reading them may be led to conclude that there is danger of chronic dermatitis and cancer being caused by having an x-ray made, or by being treated with x-rays. Some people on this account may be led to refuse either to be examined or treated by the rays when either the one or the other may be necessary."

Obviously, important developments have occurred since that time and although the situations then and now have many parallels, there are two main differences. In the first place, the list of suggested radiation hazards to the patient from diagnostic examination is considerably longer, and secondly, this examination is carried out with much less exposure so that, because of lack of direct evidence of the hazard, the possibility of serious effects is being inferred from clinical studies and experimental investigations performed under very different radiation conditions.

The author analyzes the available clinical and experimental data on radiation effects in relation to the problem of the possible hazards of small doses of radiation (of a few roentgens or less), used at the present time in most diagnostic procedures.

The following phases are discussed *in extenso*: (1) genetic effects of radiation; (2) somatic effects of radiation, including (a) short-term effects, (b) production of tumors and leukemia, (c) available data on radiation dosage in production of tumors (other than leukemia), i.e., clinical data, comparative data for adults and children, and experimental data, (d) available data on radiation dosage in production of leukemia, and (e) theoretical considerations; and (3) reduction of life span.

The author summarizes his analysis by stating that neither clinical or experimental data nor theoretical considerations permit definite conclusions as regards the risk to the individual of small doses of radiation. Certainly there is no justification for the quantitative estimates that have appeared in the literature of the number of cases of leukemia or of bone tumor likely to result from the small doses of radiation received as a result of environmental contamination or from diagnostic procedures. Moreover, there is no likelihood that this problem will be solved in a short time on the basis of animal experimentation and extrapolation to man, or statistical studies of groups of human beings. The only real approach is investigation of the mechanisms involved in the production of the late effects of radiation, especially the pathogenesis of radiation-induced tumors.

To avoid the risk of an agonizing reappraisal, based on opinion and not on fact, of the place of diagnostic radiology in medicine, the author recommends that (1) full advantage be taken of all the techniques which are aimed to reduce patient exposure, (2) new developments in engineering and physics be encouraged which will allow smaller and smaller doses of radiation to be used, and (3) physiologic and pathologic studies of the mechanisms of production of late radiation effects be carried out. —*T. Leucutia, M.D.*

MISCELLANEOUS

CLINICAL ENTITIES— GENERAL PHYSIOLOGICAL CONDITIONS

Causes and Prevention of Malformations (Ursachen und Verhuetung von Fehlbildungen). HELMUT KARTE. *Medizinische*, 1958, p. 583.

THE AUTHOR reviews the various factors which can induce or promote congenital malformation. Gametopathy is the consequence of changes in the male or female sexual cells. Embryopathy concerns disease of the embryo in the first third, and fetopathy, in the last third, of pregnancy.

Embryopathy can result from virus diseases in the first weeks of pregnancy (rubella, measles, varicella, mumps, poliomyelitis, hepatitis epidemica). Another possible etiologic factor has been noted in animal experiments in which deficiency of vitamins, amino-acid, or traces of metal during pregnancy seems to increase the chances of certain defects in the offspring. Ionizing x-rays, erythroblastosis, hormonal imbalance of the mother (diabetes, hypothyroidism), and some poisons (colchicine, pilocarpine, alloxan, trypan blue, urethane) are known to induce congenital malformations. Mechanical factors (amnion strings) and advanced age in the mother may also be the cause of an increase of hereditary anomalies.

—*M. Verstraete, M.D.*

The Shattuck Lecture: Studies on the Cause of Fever. W. BARRY WOOD, JR. *N. England J. M.*, 1958, 258: 1023.

WHILE GEORGE SHATTUCK, the founder of this lectureship, was Dean of the Harvard Medical School, a young Prussian, John Benedict Frese, entered the University of Dorpat as a student of medicine. As an undergraduate he learned of the works of the great German surgeon Theodor Billroth and of the pathologist Otto Weber. Both were engaged in the study of fever, particularly in relation to the pyrogenic action of purulent exudates. They had doubtless been influenced by the writings of George Zimmermann, an army surgeon who a decade earlier had stressed the frequency with which elevations of the body temperature are related to local processes of inflammation. Billroth and Weber independently reported in the early 1860's that pus from suppurative lesions, when injected into cats, dogs, or rabbits, frequently caused an immediate fever.

Buried in the obscure doctoral thesis of Frese is a fascinating account of a series of experiments that fully confirmed the observations of Billroth and Weber. In reviewing them one cannot escape the conclusion that these early workers demonstrated beyond a doubt the pyrogenicity of the purulent exudates.

The author summarizes his conclusions following a series of controlled experiments as follows:

Endogenous pyrogen derived from polymorphonuclear leucocytes has a central role in the pathogenesis of a number of forms of experimental fever.

Leucocytes in inflammatory exudates release their pyrogen into the surrounding medium while still functionally active.

The biologic properties of the leucocytic pyrogen are distinctly different from those of bacterial endotoxins, pyrexin, and the pyrogenic polysaccharides that can be chemically extracted from normal tissues.

When pyrogenic bacterial endotoxin is injected intravenously, the endotoxin itself is rapidly cleared from the blood stream and is replaced by a circulating pyrogen indistinguishable from that derived from polymorphonuclear leucocytes. The intensity of the fever produced is directly proportional to the concentration of the latter pyrogen in the plasma.

A similar sequence of events results from the intravenous injection of influenzal virus. Here, again, the height of the fever is related, not to the concentration of virus in the blood stream, but rather to the amount of endogenous pyrogen released into the circulation.

In the febrile phase of experimental pneumococcal peritonitis, leucocytic pyrogen is demonstrable in the peritoneal exudate, in the thoracic duct lymph, and in the blood stream. Its presence at all three sites closely correlates with the fever in the animal.

The febrile response to experimental streptococcal cellulitis is, likewise, directly related to the presence of a pyrogen of the leucocytic type in the circulation.

Leucocytic pyrogen and the circulating factor identified in pneumococcal and streptococcal fever act directly upon the thermoregulatory brain centers.

The chemical identity of leucocytic pyrogen is unknown at present.

Whether other body cells are capable of elaborating endogenous pyrogen of the type produced by leucocytes is also unknown.

Living, as we do, in an era of accelerating scientific achievement, we would do well to remember that fever has been recognized and studied as a cardinal manifestation of illness for more than 2,000 years. Yet today its cause is only partially understood. The full extent of our ignorance is apparent only when we leave the clinical study of fever as a sign of disease and begin to probe the molecular mechanisms involved in its genesis systematically.

—*John E. Kirkpatrick, M.D.*

New Results of Research on the Process of Aging (Surgical Aspects.) (Neue Ergebnisse der Alternsforschung; Chirurgisches Referat). R. NISSEN. *Langenbecks Arch. u. Deut. Zschr. Chir.*, 1957, 286: 121.

ANY EFFORT to formulate the concept of "biologic" old age and age in years is usually accepted as an average criterion. The author accepts age 70 as the lower limit. This is arbitrary, but it can be assumed that beginning with this age more than 90 per cent of patients have the physical signs of degeneration and the susceptibilities that must be taken into account during surgical interventions. It is interesting that 25 years ago Clairmont stated this biologic old age as 20 years younger.

The sixth and seventh decades of life represent a period of about the same average morbidity. Apparently a larger number of individuals have premature degeneration of the vascular system during the sixth than the seventh decade of life. From the standpoint of averages, the persons who have reached age 60 represent a selected group in that the majority of those whose cardiovascular system is below par die before this age. Statistically it can be demonstrated that the postoperative mortality of this group is somewhat lower rather than higher.

Recent advances have reduced postoperative mortality and morbidity so that moderately extensive operations (for hernia and on the thyroid, breast, kidney, or prostate gland) involve fewer dangers. As to the more extensive procedures, such as gastrectomy for carcinoma, the author shows that there is an increase in the number of procedures in patients over 70 years of age, although the percentage of surgical mortality has successively decreased in recent years. Gastrectomy for cancer of the stomach has the same justification in persons over 70 years as in those younger, and even multiple resections cause no increase in surgical mortality. In patients over 80 years, however, there is a tendency toward suture dehiscence at the esophagojejunostomy.

Surgery for chronic ulcer of the stomach and duodenum is justified in persons over 70 years only when hemorrhages or suspicion of malignant degeneration make it necessary.

The author believes that in patients over the age of 70 with diseases of the bile passages, the advantages from time-consuming functional liver tests are slight compared with the grave dangers involved in delaying the operation, especially when there is jaundice due to lithiasis. In acute suppurating cholecystitis, cholecystostomy with the removal of stones from the gallbladder is the method of choice. If jaundice is caused by a calculus in the choledochus, then its removal at a second stage offers a more favorable prognosis than if performed during the period of acute inflammation.

In cases of neoplastic obstruction of the gallbladder, the least intervention possible should be done. Usually the first procedure would be a decompression with production of a biliary fistula; the fistula then could be reimplanted as a subsequent procedure.

In carcinoma of the head of the pancreas, radical operation is inadvisable in patients over 70; however, in carcinoma of the papilla of Vater, radical operations have a more favorable prognosis, and it should be remembered that in the aged local excision is justifiable.

Carcinoma of the colon justifies radical intervention at any age provided the local conditions are favorable. Rectal carcinoma presents a special problem and if the tumor reaches into the lower portion of the rectum, the sphincter should always be sacrified.

Extensive intrathoracic operations are more problematical in the aged than are abdominal procedures. Up to this time, the experience with pneumonectomy and esophageal resection has been discouraging in the aged. Even if the patient survives the removal of a pulmonary lobe, chronic dyspnea that may result creates the deplorable state of combined cardiac and respiratory insufficiency. There is also the danger of infection in addition to the functional limitation of the lung. Abdominothoracic approaches should not be utilized in the aged person.

Brain surgery, the author believes, has a favorable prognosis with meningiomas; however, extirpation of gliomas in the aged does not promise the palliation achieved in younger individuals and therefore cannot be defended. Aged persons react favorably to early evacuation of extradural or subdural hematomas. Surgical treatment for trigeminal neuralgia represents a bright spot in the neurosurgery of the aged. The results justify even a radical approach.

Improved results are reported in the surgical treatment of fractures of the femur, but whether these results are due to improved surgical techniques or to nonsurgical factors, such as anticoagulants, the author is unable to state.

The author does not feel that a specialty of gerontologic surgery is justified. Pediatric surgery as a specialty certainly is justified because this branch deals largely with congenital defects which require surgical experience, whereas surgical conditions in the aged are those which most generally fall into the province of the general surgeon or into that of already recognized specialties. Supplementary measures have produced most noticeable improvement in certain types of procedures such as fluid, protein, and salt evaluations, the combating of shock, and in anesthesia. Modern measures, however, have done little to improve thromboembolic conditions and the author is skeptical with regard to the prophylactic use of anticoagulants. Conditions which require special attention in the surgical treatment of the aged must always include postoperative pneumonia, cardiac insufficiency, renal failure, shock, infection, and wound dehiscence.

—*W. Harrison Mehn, M.D.*

Panniculosis. Doris M. Baker. *Med. Press*, Lond., 1958, 239: 552.

Panniculosis, also known as panniculitis, may be the cause of widespread pain in healthy looking fat women. This condition is more common at the menopause, but also occurs in young women. The buttock, anterior thigh, and back of the arms are commonly affected. Pain, paresthesia, and numbness, may develop in the affected areas.

Two characteristic signs are noted: the skin is tacked down to the subcutaneous tissue and the quality of the skin is altered on palpation.

Skin biopsies in 80 per cent of 49 patients with this syndrome revealed an increase in the depth, and in some cases in the density of the collagen layer of the dermis.

Treatment consists of loss of weight, simple analgesics, and occasionally thyroid. Phenylbutazone is not helpful. In the majority of cases the condition is self-limited. The term panniculosis seems preferable to panniculitis since there is no evidence of inflammation in this syndrome. —*Charles E. Workman, M.D.*

Benign Tumors of the Synovial Membrane (Contributo allo studio dei tumori benigni delle sinoviali). Raffaele Napolitano. *Rass. internaz. clin. ter.*, 1958, 38: 312.

The author reports 2 cases of benign synoviomas in detail and discusses their histological appearance.

The first patient was a 36 year old female who had a small nodule at the proximal phalanx of the index finger. A local resection was done with good results.

The second patient was a 32 year old farmer who had a 2-centimeter nodule removed from the base of the thumb.

The benign synoviomas usually occur in young adults and are found more frequently in males than in females. Solitary lesions are more common than multiple ones. They are usually found along the sheath of the tendon as it inserts on the joint capsule, most frequently in the tendon sheaths of the hand, especially in the fingers. The second most common site is in the digits of the feet. The gross appearance of these lesions is usually that of a solid or cystic shiny encapsulated nodule attached to the tendon, rarely invading the tendon, and extending within the joint capsule or in the muscle. The histological appearance is variable. They are rarely of one cell type and usually contain a mixture of fibrous cells, cartilage, bone, fat, and even angiomas. They usually have a fibrous stroma and the cells are usually uniformly large, having a granular cytoplasm which contains fat or mucinous material. The blood vessels are usually abundant, consisting mostly of capillaries and rare angiomatous formations.

—Roland A. Manfredi, M.D.

Spontaneous Healing and Growth Inhibition of Malignant Tumors (Ueber Spontanheilung und Wachstumhemmung boesartiger Tumoren). K. THURM. *Zbl. Chir.*, 1958, 83: 1049.

THIS REPORT concerns 3 unusual observations of spontaneous healing and growth inhibition of malignant tumors. The first patient was a 61 year old female with marked ascites due to multiple peritoneal metastases diagnosed on surgical exploration as metastatic carcinoma. Nine weeks later, on autopsy, the primary site was found in the stomach; a highly dedifferentiated epithelial tumor was identified, infiltrating the mucosa and involving the lymph nodes, lungs, and pleura, and seeding the skeletal system. There was no evidence of the multiple peritoneal implants seen previously. The possibility of nutritional impairment by removal of ascites is suggested as an explanation.

The second patient, a 72 year old female, demonstrated that a malignant tumor may lie dormant for many years without causing great difficulty. A tumor diagnosed as spindle-cell sarcoma and fibrosarcoma was excised on 2 occasions, 37 and 49 years prior to the last recurrence. A breakdown in the host's resistence might explain this recurrence.

The third patient had an undifferentiated squamous-cell carcinoma of the tracheobronchial juncture the size of a fist; this compressed the right upper pulmonary lobe and metastasized into the neck. He, also, previously had an amputation of the penis for cancer. The tumor was followed roentgenographically for 14 years with virtually no change in size until in the last few months when rapid growth occurred.

The authors demonstrate that the growth of malignant tumors may show spontaneous inhibition, regression, or standstill for various periods of time. Differentiation of malignant tumor cells from normal tissue cells could explain some situations of spontaneous healing.

—Karel B. Absolon, M.D.

Omaintherapy for Skin Cancers (Omaintherapie der Hautcancerosen). E. M. WERMEL and I. T. KRAMORENKO. *Arch. Geschwulstforsch.*, 1958, 12: 325.

IN RUSSIA, cancer of the skin averages from 12 to 13 per cent of all cancer disease observed. Radiotherapy in most cases offers the best results. Disadvantages are observed and described by the authors.

A historic review of chemotherapy with podophyllin and colchicin is given and analytically reviewed.

The authors used a colchicin derivative called "omain" (N-desacethylmethylcolchicin,) which has a higher lytic activity and is 14 times less toxic than colchicin itself. This substance is produced commercially (colcemide). Other synonyms used are, N-desacethylmethylcolchicin, colchamin, omain, demecolcin, and colcemide.

Two hundred forty patients with skin cancer were treated. Some of them had had previous therapy, and most of their lesions were extensive. Some of the lesions were of several years' duration. The lesions included papillomas, squamous cell carcinomas, and basal cell carcinomas. Only 2 lesions did not respond. One of these was localized in the nose; it involved the cartilage and was of 26 years' duration. The other involved the hand and had infiltrated into the deeper structures.

The technique for omain treatment is simple, the 0.5 per cent ointment being applied on gauze pads. The majority of the cases were cured after 6 to 8 applications. More difficult ones required 20 treatments. The longest time necessary for cure was 50 days. The patients' ages ranged from 31 to 70 years.

Omain acts selectively on tumor tissue only and its results are rapid. Some cases only required 6 applications.

Omain therapy is free of danger and painless. There are no local reactions. Its advantage is fast healing, epithelization being complete after 10 to 12 days in the average case. Omain does not inhibit regenerative processes. Scars are movable and pliable. It can be used in early as well as late cases. The only contraindications are tuberculosis and generalized toxicity. Antibiotics and topical anesthetics can be added to the salve. The best vehicle is spermazete. Recurrences were few. No definite data can be quoted as only 8 months have elapsed since completion of this series.

—Otto Weiss, M.D.

Staining with Methyl Green-Pyronine and the Application of the Feulgen Reaction to the Cytohistochemical Study of Female Genital Cancers (La colorazione con verde di metilepironina e la reazione di Feulgen applicate allo studio citoistochimico delle neoplasie genitali femminili). GUELFO SANI. *Riv. ital. gin.*, 1958, 4: 113.

THE AUTHOR studied the behavior of nucleic acids in cancers of the vagina, portio, and corpus uteri. In every case he prepared smears and sections that were stained by methyl green-pyronine and given the Feulgen test.

In the methyl green-pyronine test the following solution is used: one part of 1.5 per cent methyl green (Holborn or Merck), one part of 2.5 per cent pyronine (Grübler), and eight parts of a mixture (pH can be changed from 2.5 to 8) of citric acid and dissodium phosphate. The time of staining is from 30 to 120

minutes. The material is then washed in distilled water for 10 seconds, dehydrated in absolute ethyl alcohol, and mounted in neutral balsam.

The ribonuclease is determined by the method of Branchet.

The desoxyribonucleic acid is determined by means of the standard Feulgen test which consists of two parts: (a) determination of the remains of the purine bodies, and (b) demonstration of the chemical reaction between the group of aldehydes and decolorated fuchsin (Schiff). The results in the smears and sections were similar in every case.

The author concludes from his histochemical and cytological observations that:

1. The basophilia of the tumor cells facilitates the distinction from other cell types.

2. The nucleic acid in the reproductive and differentiated cells of the epithelial basal and intermediate layers is quite different from that in the regressive cells of the superficial layer because of estrogen stimulation. In other words, the reproductive and differentiated cells demonstrate a protein-forming system which activates the nucleic acid in the cytoplasm and nucleolus. In the regressive cells there is little or no nucleic acid.

The author agrees with the findings of Caspersson and differentiates two types of cells: A, cells that show mitosis under the influence of the protein-forming chromatin and B, cells that are able to degenerate until necrosis under the influence of the protein-forming cytoplasm.

3. The nucleic acids contained in the cytoplasm and nucleolus of the A cells increase under external influences, while in the B cells the reaction is minimal or none.

The author establishes, from the description, that the first signs of the development of malignant cells are the nucleolus-associated chromatin and the cytoplasmatic ribonucleic acid.

For these reasons the author finds the methyl green-pyronine stain and the Feulgen test applicable not only for experimental investigations but also for diagnostic and prognostic purposes.

—George J. Sillő, M.D.

GENERAL BACTERIAL, PROTOZOAN, AND PARASITIC INFECTIONS

Intravenous Nitrofurantoin (Furadantin) in the Treatment of Systemic Infections Caused by Antibiotic-Resistant Bacteria. CHARLES E. FRIEDGOOD. *N. York State J. M.*, 1958, 58: 2044.

THE AUTHOR states that the intravenous administration of furadantin may be life-saving when bacteria prove resistant to antibiotics. The use of the drug in 26 patients ranging in age from 19 to 76 is reported.

The drug is supplied in a 10 c.c. ampule containing 60 mgm. Three ampules given in at least 500 c.c. 5 per cent glucose in water or isotonic saline solution is the usual adult dose. Patients weighing less than 120 pounds or more than 180 pounds receive 3.5 mgm. per kilogram. Following improvement, in 3 to 7 days, the drug is given by mouth for a period up to 2 weeks.

The drug was found effective against Proteus, Escherichia coli, Pseudomonas, Aerobacter aerogenes, micrococci, enterococci, Streptococcis hemolyticus, and Streptococcus fecalis. One strain of streptococcus, 1 strain of Proteus, and 2 strains of Pseudomonas were not eliminated.

No fatal complication due to furadantin has ever been reported. Occasional transient hemolytic anemia has been reported in Negro patients. There were no toxic or allergic reactions in this series of 26 patients.

The author reports that 17 of the 20 patients had received antibiotics before receiving furadantin. Some of the patients had peritonitis, cystitis, endocarditis, or cholecystitis. All patients showed prompt remission of fever and leucocytosis. Blood and urine cultures became sterile in all but 4 patients. The author regards the drug as valuable, even life-saving in antibiotic resistant systemic infections.

—Charles E. Workman, M.D.

DUCTLESS GLANDS

Homotransplantation of Thyroid Tissue in Uniovular Twins. G. A. VON HARNACK, W. HORST, W. LENZ, and L. ZUKSCHWERDT. *Germ. M. Month.*, 1958, 3: 172.

PRIMARY HYPOTHYROIDISM is usually treated by substituting thyroid extract. Comparison between treated and untreated hypothyroidism reveals the great advantages of substitution therapy. There are, however, two shortcomings: thyroid substitution can never be as evenly maintained as normal hormone secretion and the doses cannot be as readily adapted to the constantly changing requirements. The ideal form of treatment would be to use normally functioning thyroid to supply the needs in hypothyroidism.

This form of treatment was carried out in a case of severe hypothyroidism in one of uniovular twins. The mother of these twins suffered from thyrotoxicosis in her late pregnancy. At birth, one of the twins, Marina, was heavier and slightly taller than her twin sister Christine. During the second month, the parents noted that Christine's tongue was larger, that she took nourishment sluggishly, vomited frequently, slept a great deal, and was constipated. Her twin sister developed normally. At 2¼ years Christine spoke only a few words and looked dull and sluggish. Her thyroid gland was not palpable. Marina's thyroid showed a normal I^{131} uptake and her radioautogram had the characteristic butterfly pattern. Christine's radioactive iodine uptake was nil.

Christine was started on thyroid extract at 2¼ years, after which the twins resembled each other progressively more during the ensuing months. Anthropological and blood studies demonstrated that the twins were most certainly uniovular.

Christine's mental development progressed satisfactorily after treatment. Her development, however, had remained somewhat behind that of her healthy twin sister. Transplantation of some thyroid tissue from the healthy to the retarded twin was contemplated, especially since transplantation was theoretically possible in uniovular twins. The antigenic structure is identical in uniovular twins.

The question arose whether implantation of isolated pieces of thyroid tissue or transplantation with vascular anastomosis in the recipient should be used. Animal experiments showed that the former method

was to be preferred. No thyrotropic hormone was used as an adjunct to treatment. It was decided to place the transplants on each side of the trachea, the normal site of the thyroid gland.

The operation was done when the twins were 7.5 years old. A wedge-shaped piece was removed from what appeared to be a normal gland in the healthy twin, divided into two parts, and one part inserted on each side of the trachea. Both twins were given penicillin for a few days. The postoperative course in each case was uneventful.

Christine felt perfectly well for 3 months, after which she began to show signs of hypothyroidism and thyroid medication was resumed, but less than before operation. She was mentally alert and did well at school. One year after operation thyroid extract was discontinued without any change in her activity or temperament.

The authors conclude that neither hereditary tendencies nor the influence of maternal thyroid function on the fetus could have been the decisive factor in the development of hypothyroidism in one of the uniovular twins. The causes of the development of congenital hypothyroidism are still unknown.

—*Alfred H. Noehren, M.D.*

Malignant Tumors of the Thyroid Gland. John E. Skandalakis, Edgar O'Connor Rand, and David Henry Poer. *J. M. Ass. Georgia*, 1958, 47:165.

This report is based on 124 cases of thyroid cancer collected from six hospitals in the greater Atlanta, Georgia area, covering the years 1947 to 1956, inclusive. A total of 3,653 thyroidectomies were performed during that period, revealing an incidence of cancer of 4 per cent. This figure was not obtained from 124 cases of cancer but from 147 cases which were actually found, although 23 of these cases were not used for the study because of the lack of an operative and pathologic record.

Twenty-six per cent of the patients were male and 74 per cent were female. The youngest patient was a female 7 years old and the oldest also a female 76 years old. The most prominent decades were the third, fourth, fifth, and sixth, and 8 per cent of the patients were under 20 years of age; 18.5 per cent were over 60 years of age.

In 4 cases a diagnosis of "invading adenoma" was made, because the sections showed normal-appearing thyroid tissue invading veins, lymphatics, and capsule. All 4 patients are living and well, 2, 3, 5, and 8 years after surgery, although in no case was radical surgery performed. Forty-nine of the 124 cases were reported as papillary carcinoma. In 9 of these there was a nonpalpable thyroid (grossly normal), but with unilateral, extrathyroid masses. In all of the cases, the extrathyroid mass was found to be metastatic thyroid carcinoma and after thyroidectomy the primary cancer was found in the thyroid gland. In 17 of the patients the diagnosis was follicular adenocarcinoma. Twelve others had mixed tumors, papillary and follicular types being found. In 14 of the patients, the pathologic diagnosis was nonclassified adenocarcinoma. Another 14 cases were reported as carcinoma simplex. In 9 cases of this series so-called "rare tumors" were found. These included 3 lymphosarcomas, 2 Hürthle cell carcinomas, 2 epidermoid carcinomas, one spindle cell sarcoma, and one malignant paraganglioma.

The authors theorize that all the nodules in the thyroid gland are potentially malignant and state that exploration is mandatory in all cases of thyroid tumor. The co-operation of the surgeon and the pathologist is the primary factor toward better scientific judgment. They believe that the pathologist should always be present in the operating room and that a frozen section should be made. A total extracapsular thyroidectomy, if possible, for any thyroid cancer not including the anaplastic type, is the treatment of choice. If lymph nodes are involved, total extracapsular thyroidectomy plus neck excision of the nodes, or en bloc dissection if an infiltrative process is present, should be performed.

—*Matthew H. Evoy, M.D.*

A Case of Mucoviscidosis (Ein Fall von Mukoviszidose). L. Howanietz. *Klin. Med.*, Wein, 1958, 13: 157.

The classical clinical picture of mucoviscidosis as described by Farber in 1944 (*Arch. Path.*, 1944, 37: 238) is that of a primary systemic disease characterized by the production of abnormally viscous secretions in the pancreas, the bronchial, and the salivary glands. Fibrosis of the glands and obstruction and respiratory infections were secondary manifestations. The author reports a unique case with associated abnormalities of the bile duct.

The 14 month old female infant expired of pneumonitis. With the exception of pulmonary changes on the roentgenogram no other abnormalities, especially no icterus, were found and pancreatic function was within normal limits. At autopsy there were multiple small cysts in the lungs, evidence of lobular pneumonia, and the bronchi were filled with whitish mucous material. The pancreas was essentially within normal limits. The liver was yellowish and infiltrated with fat. The excretory biliary system was patent and the common and hepatic ducts dilated. The gallbladder contained viscous whitish-yellow mucous material, but, histologically, the mucosa showed no changes. The mucosa of the bile ducts was green or yellowish, markedly thickened with necrotic changes in the bile ducts and adjacent inflammatory infiltration and granulation tissue on microscopic examination. Typical changes of mucoviscidosis were seen in the salivary glands, namely, flattened epithelium in the acini and mucus-filled lumina.

Liver cirrhosis and hepatitis associated with mucoviscidosis have previously been described in the literature; this association is considered coincidental. The possibility of some association with biliary cirrhosis is more probable. The experimental evidence points to the parasympathetic being in some relationship to mucoviscidosis since similar pathological pictures were produced experimentally by the administration of acetylcholine.

The generalized derangement of secretion of the glands in the case reported resulted in an accumulation of highly viscous bile which caused necrosis of the epithelium of the intrahepatic bile ducts, formation of granulation tissue, and obstruction. New formation of the intrahepatic bile ducts may have avoided the development of jaundice. —*Karel B. Absolon, M.D.*

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HOSPITALS; MEDICAL EDUCATION AND HISTORY

Postgraduate Surgical Training and the Changing Economic Status of Patients. HAROLD A. ZINTEL. *J. Am. M. Ass.*, 1958, 167:211.

THE AUTHOR provocatively states the apparent change in our economic order in respect to voluntary and involuntary health insurance which has produced difficulties in graduate teaching. Residency training introduced to the United States by Halsted, which has been adopted by most branches of medicine, provides gradually increasing experience and responsibility until the final year when complete or nearly complete responsibility is given to the resident.

Surgery is the first specialty to be seriously affected, because voluntary surgical fee insurance is the most popular type of medical fee insurance today. Thus, surgery, the most popular type of graduate medical training, is the first specialty to have its graduate medical training affected by the changing economic status of patients. In medicine, pediatrics, and many other medical specialties, responsibility to a large degree can be given to an intern or resident. This can be done without seriously jeopardizing the attending physician's ethical, moral, and legal responsibilities to the patient. This is not true in surgery. In most of the medical specialties the results of therapy hinge primarily neither on what happens in a certain period of minutes to several hours nor on the technical skill of one individual. The operative part of surgery is only a relatively small part, but no one will deny that it is important. The rapid disappearance of the ward service patient and the inability to use private patients create various ethical, moral, and economic problems. These problems apply to all hospitals.

Since 1956 there have been more students of medicine in internships and residencies than there have been in the medical schools. This means that one in seven physicians in the United States today is taking medical postgraduate training, and the number is increasing, not decreasing. This is a problem then for every hospital that hopes to have a good intern and residency program. The question is asked, "Who pays for this additional program?" With the development of the insurance programs, the private patient no longer helps in a major way to support the total effort of the hospital as he did a few years ago. Who does now or who will in the next few years pay for this expense of the hospital? Will it be the rapidly disappearing large donations, the many friends of the hospital, the attending doctors, the Community Chest, the insurance companies, the federal government, or each individual consumer of medical care. Furthermore, many county and state medical societies and insurance companies, Blue Shield programs, as well as state laws, take the stand that the individual who signs the insurance forms for the surgical fees indicates by his signature on the form not only that he was responsible for the patient but that, in addition, he performed the operation. The doctors who express or give the impression of the attitude that they have completed their medical training, are in private practice, and, therefore, have no concern for the welfare patient, medical research, or training, are not true members of the profession in the light of the oath of Hippocrates. They also ignore the estimate by Gregg that probably 90 per cent of their patients are alive today, rather than 10 per cent, as a direct result of medical research. Furthermore, they do not realize that medical research is now in its infancy.

The author raises the following question: Would the American people who were so eager to pay their own way by purchasing voluntary hospital and professional fee insurance from individual companies and groups rather than sit back and demand socialized medicine, also be eager to individually help foot the bills of research, development, and teaching, rather than to depend in the future almost entirely on government subsidy? It is not the intention of the federal government to provide all or nearly all of these costs. At the present time, the federal government provides directly or indirectly 50 per cent of the costs of research and development of medical schools in the United States. In many hospitals, the surgeons and administrators feel that because of existing laws, rules, and regulations they cannot collect any of the professional fees. It is interesting to note that some hospitals take the professional fee to pay part of the cost of hospitalization when the hospitalization insurance does not cover the complete cost of hospitalization. Any remaining excess of professional fee is either returned to, or retained by, the insurance company or plan. The question is asked: Why should any hospital be allowed to take part of the professional fee to pay patients' hospitalization costs and yet not be able to use the remainder of the professional fee to support research and teaching efforts of the professional staff? If we, as a professional group, cannot agree on a clear road for the future, the decisions will be made by other interested groups or by other forces. In the words of John R. Paine, "The private patient must be redefined, and medical ethics and morals must be revised. The sooner the medical profession in particular, and the public at large, realize this fact, the better off everyone will be. If this is not the case, the system of surgical training as we know it, based on the graduated residency, is going to collapse from a lack of ward-service patients."

—Lloyd D. MacLean, M.D.